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FAUNA HAWAIIENSIS

VOL. I. PART I.

HYMENOPTERA ACULEATA

R. C. L. PERKINS.
Prof. AUG. FOREL.

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FAUNA HAWAIIENSIS

OR THE

ZOOLOGY OF THE SANDWICH (HAWAIIAN) ISLES:

Being Results of the Explorations instituted by the Joint Committee
appointed by

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SECRETARY OF THE COMMITTEE.

VOLUME I. PART I.

HYMENOPTERA ACULEATA

By R. C. L. PERKINS, B.A., and Professor AUGUSTE FOREL.

Pages 1—122, *Plates I, II and Map.*

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INSCRIBITUR.

I. HYMENOPTERA ACULEATA[1].

§ 1. General considerations on the Aculeata.

The Aculeate Hymenoptera of the Hawaiian Islands form an important part of the fauna, nearly 200 species being at present known. Each of the large divisions of the group, excepting the Heterogyna or Ants, is represented by many endemic species. The Fossores include 34 species, divided between four sub-families; the Diploptera are well represented by 88 species in two sub-families, the Anthophila or bees by 56 species in three sub-families. The total number of species in these groups as represented in the islands, is therefore 178, but of these some are known to have been introduced in recent times from other countries, while others from various kinds of evidence we can be tolerably certain are also to be regarded as having been imported by man. To arrive at a true understanding of the peculiarities of the fauna, it is necessary to consider each family in detail.

i. In the Fossores the Sphegidae are represented by a single species of *Pelopœus*, an American insect, known to have been introduced.

The Trypoxylonidae have two species of the genus *Pison.* Although both of these were described from the islands yet one of them is also known to inhabit Fiji. It is an abundant species, generally being found about houses, and nests in the woodwork of which these are built, and is never found at any great distance from towns or settlements. The second species was found only in Honolulu some twenty years since. There is little doubt that both these species are importations, and I suspect that *P. iridipennis* after arrival has failed to establish itself.

The Mimesidae have 10 species divided equally between two genera, both of which are endemic. The two genera are certainly allied, and have probably arisen by divergence from a common ancestor, and evolved species side by side, the one not being a direct off-shoot of the other.

The Crabronidae are represented by 21 species in two genera, of which one containing 6 species is endemic, as also are all of the 21 species. It is probable however that the 15 endemic species now referred to the sub-genus *Solenius* of

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[1] By R. C. L. Perkins; except Heterogyna (or Ants): this is by Prof. Aug. Forel of Zürich. Hymenoptera Parasitica has been undertaken by Dr L. O. Howard and Mr Ashmead, of Washington. There are no Hymenoptera Sessiliventres in this Fauna.

Crabro, will themselves ultimately form one or more peculiar genera, the species being closely related to one another, and also to the endemic genus *Nesocrabro*.

Putting together the results of this analysis it will be seen that the foreign element includes 3 species of two genera, representing two sub-families, two of the species and both genera being known from elsewhere, while the third species has only been taken in the city of Honolulu, a fact which alone would mark it as foreign. This gives an average of 1·5 species to the genus. The endemic species also represent two sub-families, with four genera, and 31 species. Three of the genera are endemic and all of the species, and there is an average of 7·75 species to a genus.

ii. In the true Wasps, or Diploptera, the Vespidae have two species of *Polistes*, both foreign forms, and known to have arrived since the settlement of white men on the islands. There is no doubt that both were introduced by man, and it is remarkable that a parasitic *Stylops* should have been brought with them.

The Eumenidae are represented by the single genus *Odynerus*, which is extremely rich in species, no less than 86 distinct species having occurred. All the species are endemic and form a most remarkable assemblage, exhibiting a great variety of form, although all belong to one section of the genus. Some of the species might readily be separated as distinct genera, were this course advisable, so great are their peculiarities, but as this would still leave the bulk of the species in *Odynerus*, and dissociate what appears to be really a natural series, it seems better to leave them intact, until they can be separated as a whole.

iii. In the Anthophila, or Bees, the Obtusilingues have 52 species all belonging to one genus, which, so far as is known, is endemic. These again form a remarkable series, and some of the species at first sight would hardly be recognized as belonging to the section to which they are assigned. Nevertheless when studied as a whole they are seen to be intimately related to one another, widely different as the extreme forms of the series may appear.

The Acutilingues are very poorly represented by a single *Xylocopa*, known to have been imported, and three species of *Megachile*, two of which are recent introductions, although not identified from elsewhere. They have greatly increased in numbers, and extended their range over the islands during the last few years. The third species is very possibly endemic, and is probably becoming scarcer, being now a rare insect, or at least excessively local.

Thus of the Fossores, Bees, and Wasps together, there are 170 endemic species in 7 genera, four of the latter being also endemic, with an average of over 24 species to a genus, while there are 8 introduced species representing 5 genera, giving an average of less than two species per genus.

The arrival of *Megachile* in the islands, presuming that *M. diligens* is really an endemic species, was no doubt very recent, compared with the remote periods at which the first representatives of the Fossores, Odyneri and the blunt-tongued Bees reached them. Yet both Dipterous insects and Lepidoptera must have been well established before the arrival of the predatory wasps. The *Megachile* amongst the endemic aculeates occupies a position similar to that of the solitary species of *Corvus*, and *Buteo* amongst the endemic land-birds.

iv. The Heterogyna, or Ants, form a striking contrast to the other groups of the Aculeata. Twenty species are at present known, and these are distributed amongst twelve genera. Nearly all of these are to be found most numerously in the neighbourhood of houses, although some have now spread very widely over the country, and still are spreading. The only one that has any claim to be considered endemic is a species of *Ponera*, (*P. perkinsi*), which is found only in the mountain forests under logs, and beneath the stones on the margins of the mountain streams. Two other species are not at present known from elsewhere, but of these one, (a *Prenolepis*), is known to have been introduced in boxes of earth containing plants, and the other (*Ponera kalakauae*) has been only taken near settlements, where endemic insects were absent, and it also occurs in the middle of the city of Honolulu. Of the rest, several species form races now described for the first time, but as the exact locality whence they have been imported is unknown, it is quite uncertain whether these races have been formed since the time of their importation. We have known a single box of imported plants to contain the winged sexes of three different species of ants. It is not unlikely, however, that the *Leptogenys* is a natural immigrant, and has arrived in drift-wood, for it frequently nests in the interior of tree-trunks, or beneath tightly-fitting bark. The *Ponera*, which is alluded to above as being probably endemic, may be classed with the endemic *Megachile*, as a recent form compared with the rest of the native Aculeates.

Insular endemicity. The species of *Megachile* that is probably endemic has been found on several of the islands, and the endemic *Ponera* is also distributed over the whole group. Excluding the non-endemic species (amounting to about 27), the two species just mentioned and five *Odynerus* the localities of which are unknown, there is still left a total of 164 species of endemic Aculeata.

The proportion of peculiar species to the total number found varies greatly in the case of the different islands, as shown in the following table.

	Peculiar species	Total of species	Percentage of peculiar species
Kauai	30	33	90·9
Oahu	22	33	66·6
Molokai	10	38	26·3
Maui	17	49	34·6
Lanai	2	26	7·6
Hawaii	44	54	81·4

Thus Kauai stands easily first in the peculiarity of its species, and it may further be remarked, that in the case of two of its three species which are found also on other islands, the Kauai form is by no means identical with that occurring elsewhere, but exhibits well-marked variation. Hawaii with far the largest area of any of the islands, has the greatest number of species, and ranks next to Kauai in the proportion of those peculiar to it. Maui with the second highest total of species has a much smaller proportion of peculiar ones than Oahu. In general the more remote is a given island from its neighbours the greater is the peculiarity of its fauna. The fact that Hawaii and Kauai are placed at either end of the chain of islands would tend to increase the endemic at the expense of the total number of their species, since they give and receive emigrants in one direction only. It is true that the island of Niihau lies to the west of Kauai, but it is a small and unimportant island with no considerable mountains, which can never have possessed more than a scanty fauna, and being now a pasturage for sheep was not visited by me. The Aculeata of the three adjacent islands Maui, Molokai and Lanai are much more nearly related, and a large number of species are common either to two, or to all of them. The mountains of West Maui yield some of the species which otherwise are quite peculiar to Molokai. That Maui surpasses Molokai in the number and in the peculiarity of its species is due to the much greater size and much more varied conditions of the former island. Its two widely separated mountain masses each yielding peculiar species, the great elevation of Haleakala, of which the region above the forest-belt has a special fauna, and the extensive low sandhills, dividing its eastern and western mountains, and favourable for Hymenoptera, give it a great advantage. Hawaii, as might be expected from the extreme difference in climate between the leeward and windward sides, and the very great height of its mountains, is very rich in species, and its position is favourable for a high percentage of forms peculiar to it. Oahu has the advantage of two separate mountain-ranges, each with some peculiar species, but the mountains are only of moderate height. Only two of its species are the same as those of Kauai, but it has seven identical with those of the less distant island of Molokai. Apparently not a single one of the species tabulated above extends its range over the whole group, although two or three are found on all the islands from Oahu to Hawaii.

With regard to the affinities of the endemic Hawaiian species, with those of other countries I think, in the present state of our knowledge, that there is little to be said. F. Smith expressed the opinion that they were most nearly related to the North American aculeates. Probably he based this opinion partly on the occurrence of certain well-known American species (of *Xylocopa*, *Polistes*, *Pelopœus*), and partly on the statement of de Saussure that certain of the *Odynerus* belonged to groups found in N. America. As I have mentioned above those American species that are known to occur also in the islands, have certainly been introduced by man, and therefore cannot be taken into account in deciding the affinities of the fauna. De Saussure's opinion on the Odyneri is open to suspicion, because he assigns the Hawaiian species that he examined to several of his groups of American *Odynerus*, whereas after an examination of the complete series of species described in this work, it appears that these are in reality intimately related to one another. As a matter of fact the Aculeata are a group but ill-adapted for throwing any light on the derivation of the Hawaiian fauna. *Odynerus*, the most numerous in species of this group, is a genus almost ubiquitous over the world, with vast numbers of species described, and no doubt vast numbers still uncollected. Although these display an extraordinary diversity of form and appearance, they have so far defied any satisfactory classification. The Crabronidae are almost as unsatisfactory, and have been certainly still less completely collected. Nevertheless the fact that the Hawaiian species all belong to one of the sections, in which the males are remarkable for their 12-jointed antennae, will no doubt greatly aid ultimately in deciding their affinities. The Mimesidae likewise are a widely distributed group of obscure insects, but little collected. The bees of the genus *Prosopis*, from which I have now dissociated the Hawaiian species under a new generic name, are of world-wide distribution, and are peculiarly difficult to study, and certainly great numbers of existing species are still unknown. The structure of the terminal (concealed) abdominal segments of the male is of paramount importance in this group, yet they have been entirely ignored in the majority of species described. These structures in the Hawaiian species are very distinctive, and differ greatly from such American and European *Prosopis* as I have been able to dissect, and I suspect that the affinities of *Nesoprosopis* will prove to be rather with the species of *Prosopis* found in New Zealand or Australia than with the others.

So far as one can judge from a study of the relationship of the endemic species to one another, all the Mimesidae, Crabronidae, Eumenidae, and the Bees of the genus *Nesoprosopis* could have been evolved from four species which reached the islands at some very remote period, one of the four species of course representing each group. The total absence of any representative of so many groups of the Aculeata, certainly not less fitted to pass over the great distances between the islands and other lands, and for which the country is admirably adapted, is a point greatly in favour of the view that the numerous species of each of the families represented arose from a single immigrant species, and the examination of the structures of the species themselves greatly supports this view. How rarely an immigrant can have arrived from without, can be judged from the great number of species which fail to cross the short distances between the islands themselves.

In the fragmentary condition of their Hymenopterous fauna the Hawaiian islands considerably resemble New Zealand, but in the case of the latter country it is less extreme. At the present time the Aculeata of New Zealand have been too much neglected to make any detailed comparison of value, but few species of this group having been collected there.

An important fact in connection with the Hawaiian species is their variability. This is most noticeable in the Bees, Crabronidae, and Mimesidae, a great many of the species in these groups being in a very unstable condition. The variation is not confined to differences in size, colour, &c., but affects important structures, in which it is unusual to find any noticeable variability, and to this is due the extreme difficulty of determining and describing the numerous species, the specific characters frequently having to be taken from structures which are obviously variable.

In striking contrast with the groups above mentioned are the species of *Odynerus*. Very few of the 86 species exhibit any variation of note, and this when it occurs is nearly always of an unimportant character (e.g. colour). From this one would infer that the Odyneri have now reached the maximum of species that the islands can support, in the present condition of the Lepidopterous fauna, on which, as they prey on caterpillars, they are dependent. The Bees on the other hand are not similarly restricted, for with flowers abundant at all seasons, the islands so far as one can see, are capable of supporting much greater numbers of these than of Wasps. The Fossores, which like the wasps are predatory, living on Dipterous insects, are very variable, but the total number of species of these is insignificant compared with that of the Odyneri.

The coloration of the Aculeata of the islands is very remarkable. No one examining an extensive collection of these could fail to remark the general blackness of these insects. In the majority of the endemic species the wings are dark, with blue, violet, or purple iridescence, and such species are found in each division of the group, and in every genus. For this reason many of the Fossores, Bees, and Wasps, when on the wing, greatly resemble one another and can hardly be distinguished except by differences in their flight. It is not probable that this similarity of appearance has any protective significance, for some of the species which are clear-winged and of ordinary appearance are amongst the most abundant, and birds which alone could be their enemies, neglect both alike.

In the case of the genus *Odynerus* the coloration of the species presents some remarkable features. Thus excepting one coast species, all the Kauai forms are similarly coloured, having two white or yellow abdominal bands. On all the other islands only a very few species are found with these markings, and in general the bands, when they occur, are much less conspicuous. In spite of the identity in general appearance of the Kauai insects they are often structurally very remote from one another. Thus *O. nigripennis*, a black-bodied Wasp of large size, found on all the islands from Oahu to Hawaii, is represented on Kauai by *O. radula*, with the yellow bands characteristic of the species inhabiting that island. Again *O. heterochromus*, a black species found on Hawaii and very remote structurally from *O. nigripennis*, is also represented on Kauai by a species with two yellow bands, and so on in other instances. On Molokai a very large number of species have red markings. Two species found in company on Oahu, *O. oahuensis*, and *O. pseudochromus*, are excessively alike in superficial appearance, and unlike any other species, being both remarkable for their hyaline wings, and peculiar red markings; yet structurally they are not allied to one another. It might be supposed that the local peculiarities of coloration have a protective value, but as I have pointed out in the Proceedings of the Cambridge Philosophical Society all the evidence is opposed to this view.

Another noteworthy point about the endemic aculeates is the general feebleness of their sculpture. Of the large number of species of *Odynerus* there are certainly a good many in which the puncturation is strong and even coarse, but in many it is very feeble or nearly entirely effaced. The bees are nearly all remarkable for their fine and shallow puncturation, as also are the Mimesidae, while in the Crabronidae the general tendency is to effacement of the sculpture.

The literature relating to the Hawaiian aculeata is as follows:—

Fabricius, *Ent. Syst.* II. p. 269.
De Saussure, *Etud. fam. Vesp.* III. *Mon. Masar. et Suppl.* p. 289.
Smith, *Cat. Hym. Ins.* I. p. 23. *Id. op. cit.* IV. p. 421.
Holmgren, Eugenies Resa, *Zool.* VI. p. 441.
Smith, *J. Linn. Soc.* XIV. pp. 674—685.
Blackburn and Kirby, *Ent. Mo. Mag.* XVII. pp. 85—89.
Cameron, *Trans. Ent. Soc.* 1881, p. 562.
Blackburn and Cameron, *P. Manchester Soc.* XXV. (Session 1885—86), pp. 134—176.
Dalla Torre, *Wien. Ent. Zeitg.* VIII. (1889), p. 124 *et seq.* (also *Cat. Hym. Ins. passim*).
Perkins, *Proc. Phil. Soc. Cambridge,* Vol. IX. Part VII. (1897), p. 378.
Altken, *Ent. Nachr.* XXIV. (1898), p. 340.

§ 2. Systematic account of the Hymenoptera Aculeata.

FOSSORES.

The Fossorial Hymenoptera of the islands are represented by only six genera, and of these probably two have no place in the autochthonous fauna. All the genera belong to that section, which comprises the insects with short prothoraces, and they represent four distinct sub-families. The truly endemic species however belong entirely to the Mimesidae and Crabronidae, and all prey on Dipterous insects; the members of the former family, so far as I have observed, provisioning their cells invariably with species of Tipulidae, while those of the latter prey not only on these, but also on other Flies. In some cases at any rate a species of Crabro will take Flies of very different species, by no means confining its attention to the capture of one particular kind. Some of the species of this genus are very abundant, and may sometimes be seen in great numbers around a dead animal, to which they are attracted by the abundance of their prey.

SPHEGIDAE.

(1) *Pelopœus caementarius.*

Sphex caementaria, Drury, Exot. Ins. I. p. 105.

Pelopœus caementarius, Blackburn and Cameron, P. Manch. Soc. xxv. p. 173.

HAB. Very abundant all over the islands, but not extending to great altitudes on the mountains. An introduced species, common in North America. Preys on Spiders.

MIMESIDAE.

The Hawaiian Mimesidae form two distinct genera, the females of which are very unlike one another, but the males in some cases can only be distinguished by slight characters. In the genus *Nesomimesa* the males of the several species are excessively difficult to separate, but the females afford better characters. All the species are remarkable for the feebleness of their thoracic sculpture. The genal spines of the ♀, although subject to excessive variation in most species, nevertheless afford useful characters, as also does the condition of the surface of the anterior area of the propodeum, and the colour of the spines of the anterior tarsi. In the genus *Deinomimesa* also the females afford the better characters. These are chiefly found in the form of the clypeus, but the carinated pedicel of the basal abdominal segment, although variable in structure in some species, is of considerable assistance in the determination of the species. The Hawaiian species of the family, so far as they have been observed, prey entirely on Tipulidae. They usually burrow in the ground, but have occasionally been seen entering burrows in dead trees.

Nesomimesa, gen. nov.

Forma gracili, elongata, capite a fronte transverso. Palpi maxillares longi, pilosi, articulo 2° et 3° fortioribus, 4° elongato lateribus parallelis, 5° forma praecedentis sed longiore, 6° perlongo et gracillimo. Palpi labiales articulo apicali perlongo. Antennae longae, ♂ evidenter, ♀ subfortiter clavatae. Tibiae posticae spinis brevibus armatae. Tarsorum articulus apicalis ♀ in basali parte spinis utrinque fortioribus armatus, ad apicem spinis longis, gracillimis. Abdominis segmenti primi pars petiolata parte apicali evidenter longior. Armatura genitalis ♂ duabus appendicibus angustis et elongatis apice instructa. Caput ♀ utrinque spinis genalibus armatum; area pygidialis triangularis, punctata, setis decumbentibus vestita.

Allied to *Mimesa*, having a similar neuration. Both sexes have long clavate antennae, but the thickening of the apical joints is more pronounced in the ♀. The third joint is much longer than the fourth, which is about equal in length to the scape. In the ♀ the cheeks beneath are prolonged into a large spine, which differs in form in the different species, and is very variable in examples of the same species. This sex is also remarkable in having the last joint of the tarsi armed on either side towards the base with somewhat stout spines; at the apex there are longer and very fine ones. The pygidial area is flat, punctured, and carinated at the sides, and bears appressed setae of a spinose character, which give it an appearance of being strigose. The stipites of the ♂ genital armature are rounded at the apex, and there bent inwards, and fringed with hairs; a little before the apex they each give off a long thin process, set with short hairs, and the one crossing the other. The spine of the apical ventral segment is long, strong, and slightly curved upwards.

(1) *Nesomimesa kauaiensis*, sp. nov.

Nigra, elongata, antennarum articulis apicalibus subtus, tarsisque ♂ anterioribus plus minusve pallidis; clypei ♂ margine antico plus minusve distincte tridentato; genis ♀ post oculos in spinam validam productis. Alae subinfuscatae. ♂♀. Long. 8·5—13 mm. (Plate I. figs. 1—1 *c*.)

Male black, the front tarsi testaceous, the apical joints of the antennae pale beneath. Clypeus with dense silvery pilosity, its apical margin more or less distinctly tridentate. Antennae long, subclavate, extending back as far as the apex of the basal segment of the abdomen, the third joint considerably longer than the scape. The front and vertex of the head are dull, without evident puncturation. Mesothorax less dull than the head, with very feeble scattered punctures, the surface with an exceedingly fine reticulation of raised lines; wings more or less infuscate. Anterior area of the propodeum smooth except for the minute surface sculpture (which is like that of the mesothorax), not defined by a raised line, but rendered distinct by the absence of the pubescence which covers the rest of the propodeum. Spines of the front tarsi pale. Abdomen impunctate or nearly so, the petiole long and narrow, much longer than the apical part of the segment, usually rounded above at least on its basal portion, but somewhat compressed in some examples.

Female generally larger and more robust than the ♂, but with similar sculpture. The apical joints of the antennae more or less fulvous beneath. Head large and wide, mandibles very long, the anterior margin of the clypeus angulately produced in the middle, the cheeks behind the eyes produced into a strong spine, which continues their outline, the antennae more strongly clavate than those of the ♂, their third joint very long and slender. Anterior tarsi with much longer pale spines, and the posterior and intermediate tibiae and tarsi with the spines much more strongly developed. Apical dorsal segment of the abdomen carinated at the sides, punctured, clothed with appressed hairs, which give it a strigose appearance.

Hab. Kauai (2500—4000 ft.); common, burrowing in the hard ground in bare spots in the forest.

(2) *Nesomimesa sciopteryx*, sp. nov.

Praecedentis forma; alis totis piceis, clypeo subtiliter griseo-pubescente distinctissima. ♀. Long. 11 mm.

Female very like that of the preceding in form. The wings are entirely of a pitchy colour, and have a slight violet iridescence. The face below the antennae is clothed with a fine greyish pubescence, instead of the appressed silvery pilosity of all the other Hawaiian species. The posterior calcaria are testaceous, and the petiole of the abdomen is stouter, and its dorsal surface more strongly curved.

Hab. Halemanu, Kauai (4000 ft.); very rare, 1 ♀ only taken.

(3) *Nesomimesa antennata.*

Mimesa antennata, Smith, Cat. Hym. Ins. iv. p. 431.

N. kauaiensi simillima; ♀ spina genali ad basim contorta, ♂ clypei margine apicali haud evidenter tridentato distinguendus. ♂ tarsis anticis testaceis, ♀ propodei area antica haud nitida, tarsorum spinis anticorum pallidis. ♂ ♀. 7—13 mm.

Very like *N. kauaiensis*, but generally the ♀ is less robust and has the head smaller. It may be at once distinguished by the form of the spine on the cheek, which, instead of continuing the outline of the face behind the eyes, is raised at the base, and somewhat twisted, so that, in a lateral view of the head, the spine presents a sharp edge. The apical margin of the clypeus is produced into a small median tooth. In well-developed examples the facial spines are very long, more or less pointed at the apex, and their margins sinuate. The mesothorax is somewhat shining, the scutellum distinctly so, the anterior area of the propodeum very dull, as compared with the scutellum. The wings are sometimes more or less clouded, often almost entirely clear. The spines of the anterior tarsi are pale.

The ♂ differs from that of *N. kauaiensis* only in the shape of the anterior margin of the clypeus, which is not evidently tridentate, although somewhat produced in the middle.

Hab. Mountains of Oahu (2000 ft. and upwards).

(4) *Nesomimesa nitida*, sp. nov.

Praecedenti simillima; ♀ area propodei antica nitida, ♂ tarsis anterioribus infuscatis distinguendus. ♂ ♀. Long. 7—12 mm. (Plate I. figs. 1 and 1 *a*.)

Extremely like the preceding species. The ♀ is distinguished readily by the form of the spine on the cheeks, when this is well developed. In such examples, when the head is viewed from in front the spines are widely, and more or less obliquely, truncate at the apex, and the margin is there reflexed. When the spines become reduced in size this distinction is lost, in which case the smoother anterior area of the propodeum, which is but little less shining than the scutellum, will separate the two species. The wings are entirely, but not very deeply, infuscate, and often have a blue iridescence. The spines of the tarsi are for the most part pale.

The ♂, which varies greatly in size, can only be distinguished, so far as I can see, by the darker anterior tarsi.

Var. *α*. Abdomen red. (♀.)

Hab. Molokai, Lanai, and Maui (2000—5000 ft.). It is possible that the examples from Maui, of which I have seen only one or two, may be distinct.

(5) *Nesomimesa hawaiiensis*, sp. nov.

Duabus spp. praecedentibus simillima; ♀ spinis genalibus plerumque brevioribus, acutis; area propodei antica opaca; tarsorum spinis piceis vel nigricantibus distinguenda. Tarsi ♂ anteriores obscurati; area propodei antica haud nitida. ♂ ♀. Long. 6·5—13 mm.

Female similar to those of the two preceding in general appearance. The spines on the cheeks apparently do not ever attain to so great a length as in well developed examples of those species. In front view they are acute at the apex, and divergent, but sometimes are so short as to be invisible in this aspect. The thorax is altogether duller than in the allied species, the anterior area of the propodeum being quite dull. The spines of the tarsi are dark.

The ♂ is extremely similar to that of *N. nitida*, but the duller surface of the anterior area of the propodeum will usually distinguish them.

Hab. Mountains of Hawaii (4000 ft.); widely distributed.

Deinomimesa, gen. nov.

Genus *Nesomimesae* cognatum. Genae ♀ inermes; clypeus fortiter elevatus, labro patente; antennae fortiter clavatae. Abdominis segmenti primi (♂ ♀) pars petiolata distinctissime carinata.

The species for which this genus is formed are evidently allied to those of the genus *Nesomimesa*, but the females present peculiar and striking characters, and the males are not difficult to distinguish. In the former sex the antennae are more strongly clavate, the cheeks are not armed with spines, the clypeus is greatly raised, and exposes the whole or a great part of the large labrum, and the posterior tibiae and tarsi are much more densely spinose. In both sexes the petiole of the abdomen is very distinctly carinated, and in some of the species is extraordinarily developed. The males may further be known by the greater development of the raised lines on the propodeum.

(1) *Deinomimesa ferox*, sp. nov.

Nigra, sparsim minus distincte punctata, antennarum articulis apicalibus subtus fulvescentibus, alis subinfuscatis. Mesopleurae subopacae. Abdominis segmentum primum fortiter et acute carinatum. Clypeus ♀ in medio margine fortiter emarginato. ♂ ♀. Long. 8—13·5 mm. (Plate I. figs. 3—3 *b*.)

Male black, the face below the antennae, and the base of the mandibles, with appressed silvery pubescence; above, with longer pale hairs, the surface dull, without definite puncturation. Antennae long, clavate. Mesothorax with some very feeble indefinite punctures, scutellum somewhat shining, the mesopleurae dull. Wings more or less clouded, the marginal cell and apical portion more deeply. Propodeum rugose. Abdomen with the petiole flattened above at the sides, and with a sharp median carina from base to apex, its surface dull, finely rugulose. The rest of the abdomen shining, and impunctate.

Female more robust than the ♂, the clypeus strongly raised, and exposing the large rugose labrum. The apex of the clypeus is deeply emarginate in the middle, the mandibles are strongly curved. Antennae with the club more definite than that of the ♂, the apical joints very wide in proportion to their length, the third joint slender, and very long. Mesothorax with feeble indistinct punctures, the mesopleurae dull. Propodeum more or less rugose, but the raised lines are not numerous, the posterior concavity is large and deep and bounded by strongly raised lines. Intermediate and posterior tibiae with dark spines, the posterior metatarsi spinose above, beneath, and outwardly. Abdomen with the petiole very wide, dull and rugulose, raised in the middle into a great carina, which (at least towards the base), is not very sharp above as is that of the ♂, and is gradually raised from the base to the apex. Behind the petiole the segment is generally longitudinally grooved, but not in all examples, and its surface is very smooth, shining and impunctate. Pygidial area as in the genus *Nesomimesa*.

HAB. Mountains of Kauai (3000—4000 ft.).

(2) *Deinomimesa cognata*, sp. nov.

Praecedenti cognata; ♂ mesopleuris laevioribus et nitidis; ♀ clypeo (desuper aspecto) levissime lateque emarginato, distincta. ♂♀. Long. 9—12 mm. (Plate I. figs. 4—4 *b*.)

Female of more slender form than the preceding species. The anterior margin of the clypeus, as seen from above, is not deeply and dentately emarginate, but only very lightly and widely so. The petiole of the abdomen is differently formed, its dorsal surface being very narrow, with the margins parallel and straight, but the sides beneath are extended outwardly, and so are visible from above, and form the outline of the segment in a dorsal view. The carina itself is much less elevated and almost of even height throughout its length. On the ventral side the basal segment lies in two planes, the basal part being sub-horizontal, the apical inclined. The latter occupies more than half the segment. In the preceding species the formation of the basal ventral segment is on a similar plan, but the inclined posterior portion is relatively much smaller.

The male is much more difficult to distinguish, but the petiole is narrower in proportion to its length, and the mesopleurae are smoother and more shining.

Hab. Kauai (4000 ft.). Local and rare.

(3) *Deinomimesa hawaiiensis*, sp. nov.

Praecedentibus minor, abdominis segmenti primi parte pedicellata carinam mediam linearem ferente: ♀ clypei margine antico (desuper viso) fortissime rotundato, haud emarginato. ♂♀. Long. 7—8 mm. (Plate I. fig. 5.)

Allied to the preceding species, but not very closely. It is of considerably smaller size. The petiole is very slender in both sexes and the carina appears as a median raised line.

In the ♂ the anterior area of the propodeum is traversed longitudinally by numerous distinct but very fine raised lines. In the ♀ the clypeus is raised, its front margin seen from above is very strongly rounded, and not at all emarginate; the basal segment of the abdomen beneath is simple, not formed as in *D. cognata*.

Hab. Kona and Kau districts on Hawaii (4000 ft.); several examples taken, but only one ♀.

(4) *Deinomimesa punae*, sp. nov.

Praecedenti simillima; ♀ scutello minus opaco, clypeo magis abrupte elevato, margine desuper viso antice subangulato, distinguenda. ♀. Long. 9 mm.

This species resembles *D. hawaiiensis* in general appearance, and in the form of the petiole of the abdomen. The clypeus is very abruptly raised, and in a front view of the face nearly the whole surface of the labrum is exposed, which for the most part can only be seen in an apical view in the preceding species. Seen from above the apical margin of the clypeus is angulate in the middle. The scutellum has a median depression and the surface is in that region somewhat shining.

HAB. Olaa, Hawaii (2000 ft.); 1 ♀ taken in June, 1895.

(5) *Deinomimesa haleakalae*, sp. nov.

D. konae simillima; ♂ parte abdominis segmenti primi pedicellata supra compressa, et carinata. ♂. Long. 8—9 mm.

Male very similar to that of *D. hawaiiensis*, but a larger insect. It may be easily distinguished by the form of the petiole of the abdomen which is compressed above from the sides into a median carina, whereas in *D. hawaiiensis* this part is flattened above and has a raised line down the middle. The front tarsi outwardly are more or less infuscate.

HAB. Haleakala, Maui (4000 ft.); a few ♂♂ taken in May, 1896.

This species in the ♂ approaches most nearly to the genus *Nesomimesa*, but the distinct carination of the abdominal petiole, and the much more rugose propodeum, assign to it the allied one; and the ♀ will no doubt be found to have the characteristic form of clypeus, when that sex is discovered.

TRYPOXYLONIDAE.

(1) *Pison iridipennis*.

Pison iridipennis, Smith, J. Linn. Soc. XIV. p. 676.

HAB. Honolulu (Blackburn). I have never met with this species. I suspect it of being an introduced species, which apparently has failed to establish itself.

(2) *Pison hospes*.

Pison hospes, Smith, *l. c.* p. 676.

HAB. Abundant all over the islands, especially about houses. No doubt an introduced species. I have received examples from Fiji.

Crabronidae.

Crabro (*Solenius*).

The fifteen species which I have referred to the sub-genus *Solenius* of *Crabro* fall naturally into three groups, which are readily distinguished by structural characters in the ♂, but the females present no special distinctions in the two groups, in which this sex is known. In the first group the sixth joint of the ♂ antennae is produced into a rather long prominent tooth at its apex; in the second it is emarginate, but only slightly produced. The third group contains only two species (one of which I have never seen), the ♂ only being known, remarkable for the form of the ventral abdominal segments. Possibly, however, Blackburn's *C. abnormis* does not really belong to this group, and *C. curtipes* is the only representative. Although I have referred these Hawaiian species to the sub-genus *Solenius*, I have no doubt they will ultimately form one or more peculiar genera. The pygidial area of the ♀ is flatter, less elongate and excavated than in typical *Solenius*, and there are other differences. The punctuation is very similar in most of the species, and is generally feeble and shallow, often subobsolete. The chief characters for specific distinction are found in the antennae of the ♂, differences in sculpture of the thorax, the colour of the pilosity of the clypeus, of the antennae, mandibles, &c., and in the form and sculpture of the second ventral segment of the abdomen.

(1) *Crabro* (*Solenius*) *monticola*, sp. nov.

Niger, clypeo argenteo-piloso, abdomine flavo-notato, alis subhyalinis. ♂ antennarum articulo sexto fortiter dentato. ♂ ♀. Long. 5·5—9·5 mm. (Plate I. figs. 6 and 6 *a*.)

Male black, second segment of the abdomen with a yellowish-white fascia at the base, sometimes reduced to a round spot on either side. Third segment black, or with a spot on each side; fourth sometimes with an entire fascia, more often an interrupted one, sometimes only a spot on each side, or entirely black; fifth with an entire fascia, often very broad, as also the sixth segment. Head and mandibles black, the clypeus with appressed silvery pubescence; antennae with the fifth joint of the flagellum emarginate beneath and strongly produced at the apex into a projecting tooth; vertex dull, the surface rugulose with very shallow and obscure subobsolete puncturation. Mesothorax dull, clothed with thin pale pubescence, the surface densely rugulose, with very feebly impressed punctures. Propodeum longitudinally rugose in front, the surface dull, clothed with pale hairs. Abdomen subovate shining, with very fine indistinct punctures; second ventral segment very finely, but not closely punctured, except on a round area on either side, where the punctures are fine and dense; third segment beneath slightly, fourth more distinctly, fifth and sixth strongly depressed.

Female with the mandibles in front (except at the apex), the front of the scape of the antennae, a fascia at the base of the second segment of the abdomen (often widely interrupted, or reduced to two round lateral spots), sometimes a spot on either side of the third and fourth segments, and a complete band on the fifth, yellowish-white. In one example a small round spot on either side of the second segment is the only abdominal marking. Sculpture very much as in the ♂, the puncturation of the thorax generally rather more distinct, the mesothorax posteriorly and the front of the scutellum more or less shining, but variable in this respect. Abdomen generally rather stouter than that of the ♂; sixth dorsal segment distinctly punctured, the surface shining; second segment beneath hardly shining, finely and remotely punctured, except on the circular lateral pubescent spots, where the puncturation is fine and very dense; the following segments with an apical row of punctures, otherwise impunctate; apical ventral segment subcarinated, and closely punctured on either side. Posterior tibiae with pale spines. Wings subhyaline in both sexes.

HAB. Mountains of Kauai (3000—4000 ft.). Mountains of Oahu, both ranges.

OBS. The Oahuan examples agree with those from Kauai in structure, but show a stronger tendency to a decrease in size or obliteration of the pale markings on the abdomen.

(2) *Crabro* (*Solenius*) *molokaiensis*, sp. nov.

Niger, ♂ antennarum articulo sexto fortiter dentato, ♀ articulo primo antice cum mandibulis flavis. Clypeus argenteo-pilosus. Abdomen nigrum. ♂♀. Long. 6·5—10 mm.

Allied to the preceding species, the ♂ entirely black, except the front tibiae which are testaceous inwardly, the ♀ with the mandibles (except at the apex) and the scape of the antennae in front yellowish-white. Clypeus with silvery pubescence in both sexes. Male with the fifth joint of the flagellum of the antennae strongly produced at the apex into a prominent tooth. Vertex of head in the mesothorax with obscure subobsolete puncturation, the scutellum, more or less, slightly shining. Abdomen beneath dull, the second segment with fine punctures, the lateral pubescent spots very finely and densely punctured; fourth and following segments deeply concave. Female with the mesothorax much more distinctly punctured than that of the ♂, dull in front but more or less polished behind, where the puncturation is less shallow and more distinct; scutellum entirely shining, not depressed in the middle, distinctly punctured: propodeum dull, rugulose, with very short longitudinal rugosity in front. Abdomen with the pygidial area of the sixth segment shining, distinctly punctured, its sides raised; second segment beneath hardly shining, remotely and finely punctured, except on the lateral pubescent spots, where there is the usual very fine and close puncturation.

Wings in ♂ with distinct blue iridescence, which is generally less evident, and sometimes wanting in those of the ♀.

Hab. Mountains of Molokai (3000 ft.), 1893. Haleakala, Maui (5000 ft.), 1 ♂.

(3) *Crabro* (*Solenius*) *mauiensis.*

Crabro mauiensis, Blackburn and Cameron, P. Manch. Soc. Vol. xxv. p. 165 (1885—86).

Resembles *C. affinis* in the golden pubescence on the clypeus, but the more deeply canaliculated front of the head, and the coarser facets of the eyes, would (the ♂ being unknown) rather associate it with *C. monticola.* That species, however, has the clypeus clothed with bright silvery pubescence.

Hab. "A single female occurred on Maui, near Wailuku, flying over flowers." (Blackburn.)

(4) *Crabro* (*Solenius*) *haleakalae,* sp. nov.

Niger, clypeo aureo-piloso, mandibulis nigris, antennarum articulo primo antice albido. Mesonotum postice cum parte scutelli anteriore laeve ac nitidum. Abdominis segmentum 2 ventrale nitidissimum, et circa medium parcissime punctatum. ♀. Long. 10 mm.

Female greatly resembling *C. molokaiensis* in general appearance but with the mandibles entirely black and the clypeus clothed with golden pubescence. Posterior part of the mesothorax and the scutellum in front with the surface smooth shining and distinctly punctured, the latter dull posteriorly. Abdomen with the second ventral segment highly polished all over the middle portion, with a very few scattered punctures, at the sides with the usual circular pubescent spots and dense fine puncturation. Spines of posterior tibiae dark, and stronger than those of the preceding species. Wings almost clear.

Hab. A single ♀ taken on Haleakala, Maui, at an elevation of 4000 ft. May, 1896.

(5) *Crabro* (*Solenius*) *hawaiiensis,* sp. nov.

Niger, clypeo argenteo-piloso, alis infuscatis, subcaeruleo-iridescentibus, mandibulis articuloque antennarum primo nigris. ♂ antennarum articulo sexto fortiter dentato. ♂♀. Long. 6—10 mm.

Both sexes entirely black, the wings infuscate, and in the ♂ with a distinct blue iridescence; clypeus with silvery pubescence.

Male with a prominent tooth at the apex of the fifth joint of the flagellum of the antennae, as in the preceding species.

Head and thorax entirely dull with very shallow subobsolete puncturation, hardly visible in some examples. Female with the thoracic puncturation, and especially that of the scutellum, much more distinct than that of the ♂, the mesothorax posteriorly and the scutellum more or less shining, but variable in this respect. Second ventral segment of the abdomen with the surface exceedingly finely rugulose, not highly polished, in the ♂ with very fine indefinite punctures about the middle, in the ♀ with remote but larger ones.

HAB. Hawaii, various localities; common at an elevation of about 4000 feet.

OBS. This species is variable in size and sculpture; the ♀ is at once distinguished from *C. molokaiensis* by the black scape and mandibles, the ♂ is very similar but the scutellum and the mesothorax posteriorly appear to be always quite dull.

(6) *Crabro* (*Solenius*) *tumidoventris*, sp. nov.

Praecedenti simillimus, sed abdominis segmento secundo ventrali fortiter convexo, mandibulis ♀ ex majore parte pallidis distinguendus. ♂ antennarum articulo sexto fortiter dentato. ♂♀. Long. 7—9·5 mm. (Plate I. fig. 7.)

Very like the preceding in general appearance; ♂ with the scape and mandibles black; ♀ with the scape of the antennae black, the mandibles white; ♂ rarely with some indication of a pale spot on the mandibles.

Fifth joint of the flagellum of the antennae produced into a prominent tooth at the apex in the ♂, the front of the head and the mesothorax with very shallow rugose puncturation; propodeum more or less longitudinally rugose in front, and in this sex usually with a few fine transverse raised lines above the insertion of the abdomen. Second ventral segment of the abdomen very convex longitudinally and transversely, the surface shining, finely and rather remotely punctured about the middle, more closely towards the sides, and very densely and minutely on the circular pubescent spots; fourth and fifth segments generally strongly depressed, sometimes the fourth less strongly, and the fifth and sixth more so. Basal joint of the front tarsi unusually wide, about twice as long as its greatest width.

Female very like the ♂, except for the white mandibles and sexual differences. Mesothorax and scutellum quite dull; second ventral segment shaped as in the ♂, finely and distinctly punctured in the middle, densely and very finely on the pubescent spots. Apical dorsal segment very narrow between the lateral carinae, more or less largely and rugosely punctured. Wings of the ♂, and often of the ♀ with blue iridescence.

Hab. Both mountain ranges of Oahu; Molokai, Lanai and Maui. Examples (at least of the ♀) from Oahu appear to have a less distinct blue iridescence on the wings than those from Molokai &c.

Crabro (*Solenius*) *tumidoventris* var. *leucognathus.*

Forma praecedentis, ♂ mandibulis, ♀ mandibulis, antennarumque articulo basali antice albis; abdomine nonnunquam albo-notato.

This form on Hawaii corresponds to *C. tumidoventris* on the four islands named above. A single ♀ from Oahu appears to hardly differ from the Hawaii form, and a few ♂♂ from Maui are somewhat intermediate. For the most part, (and I have examined many of both forms) the two are readily distinguished. The variation of the var. *leucognathus* appears to be very different to that of the typical form, since in the ♂ the abdomen not infrequently is spotted at the sides of the 5th and 6th abdominal segments, (or on one of these), and rarely also on the 2nd segment; one ♀ has small lateral whitish spots on this segment, and on the 4th, and an interrupted band on the 5th.

Hab. Island of Hawaii; Kona (2000—3000 ft.); Kilauea (4000 ft.); Olaa (2000 ft.).

(7) *Crabro* (*Solenius*) *affinis.*

Crabro affinis, Smith, J. Linn. Soc. xiv. p. 677; Blackburn and Cameron, P. Manch. Soc. Vol. xxv. (1885—86), p. 165.

Niger, alis subhyalinis, abdomine plus minusve flavo-notato. ♂ clypeo argenteo-piloso, antennarum articulo sexto haud fortiter dentato; ♀ clypeo aureo-piloso, antennarum articulo basali antice, mandibulisque plus minusve flavescentibus. ♂♀. Long. 6·5—11 mm. (Plate I. fig. 8.)

Male with the scape of the antennae and mandibles dark, in the ♀ they are more or less yellowish. Abdomen in the ♂, with the 2nd, 4th, and 5th, rarely the 3rd, with pale markings. Sometimes these markings form entire bands, or they may be reduced to lateral spots. Female with a band on the 2nd, 4th, and 5th segments, often similarly reduced in size, those on the 2nd and 5th sometimes wanting, so that probably an entirely black variety may be found.

Male, clypeus clothed with silvery hairs; antennae with the 5th joint of the flagellum emarginate beneath, very little produced at the apex, beyond the base of the following joint, so that it does not form a conspicuous prominent tooth, as in all the preceding species. Front of the head with rough, shallow puncturation, smoother on the vertex behind the ocelli. Mesothorax and scutellum dull, with shallow obsolete puncturation, but the punctures are more distinct in some examples than in others. Mesopectus at the sides posteriorly with the carinae strongly elevated, forming a stout prominent tooth when viewed from in front. Abdomen above somewhat shining; second ventral segment shining, remotely and distinctly punctured about the middle; 4th and following segments flattened and depressed.

Female with the clypeus clothed with golden hairs. Puncturation much as in the ♂, but generally more definite, the mesothorax posteriorly and the front of the scutellum being often more or less polished and shining. Abdomen with the second segment above hardly shining, very finely, but rather distinctly punctured; beneath it is very highly polished, and has only a few scattered punctures on the middle portion, and a very dense and minute puncturation on the lateral pubescent spots. Apical dorsal segment nearly flat above, its margins very slightly raised, the surface more or less rough, and punctured. Posterior tibiae with the spines well developed, and dark. Wings subhyaline in both sexes.

HAB. Kauai, abundant from the coast to 4000 ft.

(8) *Crabro* (*Solenius*) *notostictus*, sp. nov.

Niger, clypeo argenteo-piloso, pronoto cum postscutello abdominisque segmento secundo flavo-notato, antennarum articulo sexto haud fortiter dentato. ♂. Long. 6·5—8·5 mm.

Var. Abdominis segmento secundo nigro.

Male allied to the preceding, having the antennae similarly formed. Mandibles and scape of the antennae black, clypeus with silvery pubescence. Prothorax with yellow spots, the postscutellum with a transverse one. The second segment of the abdomen has a yellow band, sometimes broken into two spots or altogether absent; the other segments always black. The front of the head has the puncturation nearly obsolete and shows, in certain positions, distinct but very fine strigosity. The mesothorax is dull and rugulose with hardly visible puncturation. The second ventral segment of the abdomen with the surface evidently but very finely rugulose, and a few scattered, rather large, subobsolete punctures about the middle, the sides with the usual dense and minute puncturation. The following segments with their surface quite dull.

Female unknown.

HAB. Mountains of Oahu, taken on several occasions.

(9) *Crabro* (*Solenius*) *mandibularis*, Smith.

Crabro mandibularis, Smith, Proc. Linn. Soc. XIV. p. 677 ♀.
Crabro denticornis, Smith, (♂) *l.c.* p. 678.
Crabro mandibularis, Blackburn and Cameron, P. Manch. Soc. Vol. XXV. (1885—86), p. 167.

Niger, ♂ clypeo argenteo-piloso, postscutello (nonnunquam etiam pronoto, tuberculis, abdominisque segmento secundo) flavo-notato, antennarum articulo sexto haud fortiter dentato; ♀ antennarum articulo basali, mandibulis plus minusve, pronoto, tuberculis, et postscutello flavo-notatis, clypeo aureo-piloso. ♂♀. Long. 7—10 mm.

Black, the ♀ with the front of the scape of the antennae, the mandibles more or less, a spot on each side of the prothorax, its tubercles, and a transverse spot on the postscutellum, yellowish; the ♂ generally has only the spot on the postscutellum, rarely also the tubercles and prothorax and the sides of the second abdominal segment with yellow markings.

Male with the sixth joint of the antennae formed much as in the preceding species, being but little produced at the apex. Clypeus clothed with silvery hairs, the head above the antennae generally distinctly strigose and feebly punctured, but in small examples the strigosity is sometimes obsolete, or nearly so. In the region of the ocelli the puncturation is generally distinct though shallow; the surface of the mesothorax is smoother than that of the preceding species, the puncturation very feeble. Surface of the abdomen very finely rugulose, and with hardly visible puncturation; second ventral segment with the surface finely rugulose, and not highly polished, with sparse scattered punctures.

Female, clypeus with golden hairs; head in front strigose and punctured, smoother on the vertex posteriorly, with shallow but distinct punctures between and at the sides of the ocelli. Mesothorax with shallow punctures, the surface somewhat smooth, especially posteriorly, where it is even slightly shining (or at least less dull than in front), as also the scutellum. Abdomen with grey pubescence; second segment not shining, rugulose, without distinct puncturation, beneath the surface is distinctly rugulose and very sparsely punctured, except at the sides. Apical dorsal segment flat, its margins but little raised, dull towards the apex, punctured, and more or less smooth between the punctures towards the base. Wings quite infuscate in the ♂, less so in the ♀.

Hab. Molokai, Lanai, and Maui, on the coast and in the mountains at an elevation of 3000 ft.

This species is very closely allied to *C. notostictus* ♂, but the puncturation of the vertex of the head is more distinct, and the mesothorax smoother. The normal coloration of the two is different, the Oahuan species having, in typical examples, the prothorax and also the second abdominal segment spotted, whereas in *C. mandibularis* individuals so marked are found only as very unusual varieties.

(10) *Crabro* (*Solenius*) *fulvicrus*, sp. nov.

Niger, clypeo aureo-piloso, tibiis anticis femoribusque (plus minusve) intus fulvotestaceis; ♂ articulo antennarum sexto haud fortiter dentato, abdominis segmento 4° et 5° (vel uno ex his) nonnunquam albo-notatis; ♀ mandibulis et antennarum articulo primo plus minusve albo-flavescentibus. ♂♀. Long. 8—12 mm.

Black, ♂ with the anterior femora almost entirely, and the anterior tibiae inwardly, bright fulvotestaceous; ♀ with the colour of the femora often much obscured. Abdomen black in the ♀, in the ♂ sometimes with a whitish spot on the sides of the 4th and 5th segments, or on the 5th only, and sometimes an entire band on the latter. Scape of the antennae in front and the basal part of the mandibles yellowish in the ♀. Clypeus of both sexes with golden pubescence, of a very pale tint in the ♂.

Scape of the antennae in the ♂ often more or less fulvous, the fifth joint of the flagellum very little produced at the apex, hardly dentate. Head in front very shallowly, rugosely punctured, mesothorax with feebly impressed puncturation. Abdomen with the second segment above rather shining, very finely, but evidently punctured; beneath, with the surface shining, and finely and remotely punctured about the middle.

Female with the head above the antennae finely and densely punctured, the mesothorax posteriorly more or less smooth, and generally (as also part of the scutellum) somewhat shining. On this smoother portion there is a shallow but evident puncturation. Abdomen with the second segment above as in the ♂; beneath about the middle very smooth and shining with sparse and rather large puncturation. Sixth dorsal segment flat, its margins slightly raised, the surface rough and punctured.

Wings of ♂ infuscate generally with more or less blue iridescence, the wings of the ♀ clearer.

HAB. Kona, Hawaii (4000 ft.); Olaa (2000 ft.).

(11) *Crabro* (*Solenius*) *polynesialis*.

Crabro polynesialis, Cameron, Trans. Ent. Soc. 1881, p. 562. Blackburn and Cameron, P. Manch. Soc. xxv. (1885—86), p. 168.

Praecedenti simillimus, niger, clypeo aureo-piloso, ♂ antennarum articulo sexto haud fortiter dentato, ♀ mandibulis, antennarumque articulo basali, plus minusve flavescentibus. Tibiis anticis femoribusque haud fulvo-testaceis, mesonoto (♀) postice haud distincte punctato, abdominisque segmento 2 ventrali ruguloso, minus nitido distinguendus. ♂♀. Long. 7—12 mm.

Very like the preceding in most respects, but the ♂, so far as I know, never has the abdomen spotted with white.

Both sexes may easily be distinguished by their dark front femora and tibiae, and the ♀ by the mesothorax being duller posteriorly, and without the distinct punctuation of the preceding on that part. The second ventral segment also is evidently less highly polished, its surface being evidently rugulose.

Hab. Mountains of Hawaii (4000 ft.). Common generally.

(12) *Crabro* (*Solenius*) *unicolor*.

Crabro unicolor, Smith, Cat. Hym. Ins. IV. p. 421. Blackburn and Cameron, P. Manch. Soc. Vol. XXV. p. 169 (1885—86).

Niger, alis infuscatis, et caeruleo-iridescentibus, mandibulis utriusque sexus cum articulo basali antennarum nigris, clypeo argenteo-piloso. ♂ articulo antennarum sexto haud fortiter dentato. ♂♀. Long. 7·5—13 mm.

Black, the wings infuscate and with a steely-blue iridescence. Mandibles and scape of the antennae black in both sexes, and the clypeus clothed with silvery pubescence. Calcaria of the posterior tibiae bright testaceous in the ♀.

Male with the sixth joint of the antennae very little produced at its apex beyond the base of the following joint; head in front with shallow, close and rugose puncturation. Mesothorax with very shallow punctures, the surface somewhat smooth about the middle. Propodeum longitudinally rugose in front. Abdomen with the second ventral segment finely and not very closely punctured about the middle on its basal portion, towards the hind margin densely and very minutely; third segment somewhat depressed except at the base; the following segments deeply depressed.

Female like the ♂ in most respects. The mesothorax posteriorly towards the middle is smoother and more or less shining. Propodeum very finely longitudinally rugose to the brow, at its anterior margin the rugosity is not so fine. Abdomen with the second segment very finely but densely and quite distinctly punctured; beneath very highly polished on its middle portion and sparsely and clearly punctured, very finely and densely on the lateral pubescent spots. Apical dorsal segment nearly flat, its margins slightly raised, the surface somewhat rough, and punctured.

Hab. Oahu, Molokai, Lanai and Maui; abundant on the coast and in the mountains to an elevation of 4000 ft. or more. Preys on Tachinids &c.

(13) *Crabro* (*Solenius*) *atripennis*, sp. nov.

Praecedenti forma facieque simillimus, mandibulis antennarumque articulo basali albescentibus facile distinguendus. ♂♀. Long. 8—13 mm.

Very like the preceding in form and sculpture, but in neither sex is the mesothorax posteriorly as smooth, nor is the surface in that region at all shining. The calcaria of the posterior tibiae are darker, and the front of the scape of the antennae and the mandibles are yellowish-white. Wings deeply infuscate and with a steely iridescence, and the sixth joint of the antennae but little produced at the apex, as in the preceding species.

Hab. Common generally on Hawaii from the lowlands to an elevation of 5000 ft. Preys on Tachinids, and also sometimes enters houses and carries off the introduced house-fly.

(14) *Crabro* (*Solenius*) *curtipes*, sp. nov.

Niger, alis infuscatis, antennarum articulo sexto haud fortiter dentato, clypeo argenteo- vel pallidissime aureo-piloso, abdominis segmento primo pubescentia longa nigraque vestito, segmento 2 ventrali subdepresso, dense punctato, segmentis caeteris peropacis et depressis. ♂. Long. 6—11 mm. (Plate I. fig. 9.)

Male black, the wings infuscate and with little iridescence. Head, thorax, and basal segment of the abdomen with erect dark pubescence, clypeus with silvery, or faintly golden, appressed hairs. Antennae with the fifth joint of the flagellum of the antennae emarginate beneath, but little produced at its apex. Head very densely rugosely punctured in front, less so on the vertex posteriorly. Mesothorax dull, rugosely punctured. Propodeum with excessively short wrinkles at its anterior margin, behind these with shallow subobsolete punctures. Abdomen with the basal segment extremely finely punctured, and clothed with long dark hairs; second and following finely closely and evenly punctured. Beneath, the second segment is flattened, closely punctured, and inclined, the third flattened or slightly depressed and inclined in the opposite direction to the second, so that the two meet at an obtuse angle. The surface of the third and of all the following (which are depressed) is very dull, having an appearance of granulation or dense punctuation, which is due to a dense meshwork of raised lines. Posterior tarsi very short in proportion to the tibiae, all the joints taken together hardly being equal to the latter in length.

Hab. Kona, Hawaii, about 4000 ft.; 1 ♂, Aug. 1892. Olaa (2000 ft.), and Kilauea (4000 ft.), several ♂♂ in 1896. I do not know the ♀ of this remarkable species, which might well form a distinct genus, should the other sex present any striking characters.

(15) *Crabro* (*Solenius*) *abnormis.*

Crabro abnormis, Blackburn and Cameron, P. Manch. Soc. Vol. XXV. p. 168 (1885–86).

This remarkable species is perhaps allied to *S. curtipes*, and probably might well be separated generically from the other Hawaiian species. It differs from all these in the abruptly incrassate fifth joint of the antennae, and the extremely long tooth on the sixth. Although I repeatedly searched for it in the locality specified, I never had the good fortune to meet with a specimen.

HAB. Konahuanui, Oahu (2500 ft.); 1 ♂ taken by Mr Blackburn. The ♀ which he suggests as belonging to this ♂ is more probably that of *C. tumidoventris.*

Nesocrabro, gen. nov.

Caput inter oculos latum, haud fortiter concavum. Fossae antennales ab oculorum marginibus spatio distincto disjunctae. Clypeus pilis suberectis (haud metallicis) vestitus. Antennarum ♂ articulus sextus subtus emarginatus, apice haud fortiter producto. Alarum cellula submarginalis longe post medium, apicem versus, venam recurrentem accipiens. Area propodei antica haud definita. Tibiae posticae spinosae, tarsorum articulus ultimus fortissimus. Area pygidialis ♀ elongata, angustissima, utrinque fimbriata.

The species for which this genus is proposed appear to be allied to those which are provisionally placed under the subgenus *Solenius* of *Crabro*. The face is unusually wide between the eyes, and but little concave. The antennal fossae are separated from the latter by a considerable space. The facets of the eyes in front are comparatively fine. The clypeus is clothed with a fine suberect pubescence, instead of the appressed silvery or golden hairs, so usual in Crabronidae. In the ♂ the 6th joint of the antennae is emarginate beneath, and slightly produced at the apex. The ocelli form a triangle, much widest at the base. In the wings the recurrent nervure is received far beyond the middle (towards the apex) of the submarginal cell. The anterior area of the propodeum is not defined. The front tarsi are simple, the posterior tibiae spinose, the claw joint of the tarsi very large. Pygidial area of the ♀ elongate and very narrow, fringed on each side with long hairs, its sides carinated.

(1) *Nesocrabro compactus*, sp. nov.

Niger, thorace et abdomine albido-notatis, alis subhyalinis, abdominis segmentis apicalibus haud rufo-pubescentibus. ♂ antennarum articulo sexto subtus emarginato, apice vix dentato. ♂♀. Long. 7·5—9 mm. (Plate I. fig. 10.)

Male black, the prothorax often with two spots on the hind-margin and a small one on the tubercles, a transverse spot on the postscutellum, a band usually broad and entire on the second abdominal segment, a spot or line on each side of the third or fourth, a wide band on the fifth, and one on the sixth, yellowish-white. Basal segment also sometimes with an apical spot.

Female with a line on the scape of the antennae, the basal part of the mandibles, two spots or a band on the prothorax, a transverse spot on the scutellum and postscutellum, a broad band on the second abdominal segment, a narrower one on the third and fourth, sometimes also a line on the posterior and intermediate tibiae beneath, a spot at the apex of the front tibiae, on each of the posterior coxae and trochanters, and a small one on each side of the second ventral segment of the abdomen, yellowish-white.

These markings are very variable.

Male, with the fifth joint of the flagellum of the antennae emarginate beneath, hardly produced at the apex. Head in front, and the mesothorax with dense and rugose but shallow puncturation. Propodeum more or less longitudinally rugose. Abdomen with the second segment extremely finely punctured; beneath, somewhat strongly convex, and finely punctured; fourth ventral segment flattened or slightly depressed, fifth and sixth depressed. Apical dorsal segments with inconspicuous pale pubescence, and the puncturation almost obsolete.

Female very like the ♂ in general sculpture, but the puncturation usually slightly weaker. Posterior tibiae roughened, the asperities with short pale spines. Apical dorsal segment elongate and very narrow, coarsely punctured at the base, and sparsely fringed with pale hairs. Second ventral segment sparsely punctured about the middle, very minutely and densely on the lateral pubescent spots. Wings subhyaline in both sexes.

Nesocrabro compactus var., *lanaiensis* var. n.

Male with a large spot on the scutellum, as well as the postscutellum, yellowish-white; the band on the second abdominal segment narrow and interrupted. In the ♀ this band is less wide than in the typical specimens. The surface of the head on the vertex is smoother and less dull in both sexes, and the surface of the mesothorax posteriorly in the ♀ somewhat smooth and shining between the punctures.

Hab. Mountains of Kauai (2500—4000 ft.), preying upon Diptera of moderate size, and forming burrows in trodden pathways and bare banks in the forest. Var. lanaiensis. Mountains of Lanai (above 2000 ft.). Not common. In the ♂ the tendency seems to be to an increase of thoracic, and decrease of abdominal marking, as compared with the Kauai series.

(2) *Nesocrabro bidecoratus*, sp. nov.

Niger, mandibulis, antennarum articulo basali, thorace, et tibiis flavo-notatis, abdomine fasciis flavis ornato; segmento quinto cupreo, dense punctato, pubescentia aureo-rufa vestito, sexto pilis ejusdem coloris fimbriato. ♀. Long. 10 mm.

Female black, with the basal half of the mandibles, a line on the scape of the antennae, an interrupted band on the prothorax, a transverse spot on the scutellum and postscutellum, a spot at the base of all the tibiae beneath, and a band on each of the first four segments of the abdomen, yellow. Fifth segment of a somewhat metallic copper colour, densely punctured, and clothed with dark golden-red pubescence, the elongate sixth segment fringed with similar hairs, its surface somewhat smooth, and strongly, but not densely, punctured. Head in front with shallow dense punctures, the vertex with dark pubescence. Mesothorax clothed with black pubescence, the surface dull, the puncturation shallow, and by no means coarse. Propodeum with grey pubescence, and with short longitudinal rugosity at the extreme front; behind this dull, the surface roughened. Abdomen with the second segment densely and finely punctured; beneath, about the middle, it is impunctate; towards the sides distinctly punctured, very densely and minutely on the lateral pubescent spots. This segment and the basal have a pale yellow spot on their ventral surface. Posterior tibiae with pale reddish spines, the calcaria bright fulvo-testaceous. Wings subhyaline, somewhat clouded towards the base.

Hab. A single ♀ taken at Kilauea, Hawaii, in September 1895. In spite of its extremely distinct appearance I suspect it may prove to be a variety of the following species.

(3) *Nesocrabro rubrocaudatus*.

Crabro rubrocaudatus, Blackburn and Cameron, P. Manch. Soc. Vol. XXV. p. 172 (1885–86).

Niger, abdomine nigro, segmentis apicalibus rufo-pubescentibus; ♂ thorace opaco, haud flavo-notato, alis infuscatis, caeruleo-iridescentibus, ♀ thorace (antice saltem) opaco, alis subhyalinis minus fortiter infuscatis. ♂♀. Long. 7·5—10 mm. (Plate I. fig. 11 and 11*a*.)

Male black, the wings deeply infuscate and with bright blue iridescence; the 5th, 6th, and 7th abdominal segments densely clothed with red pubescence. Female with the 5th segment so clothed and the sixth with a fringe of the same colour, the prothorax and postscutellum sometimes spotted with yellow, wings much less dark than those of the ♂, subhyaline or lightly infuscate, sometimes with more or less blue iridescence.

Antennae of the ♂ with the 6th joint but little produced at the apex; front of the head dull and subobsoletely punctured, clothed with dark hairs and in some examples distinctly longitudinally strigose amongst the punctures. Mesothorax dull, with dense surface rugulosity and shallow puncturation. Propodeum more or less rugose, more strongly in some examples than others. Second segment of the abdomen very finely punctured above; beneath very finely and densely punctured towards the apex, less so towards the base, the punctures distinct; the apical ventral segments lightly depressed, and fringed with golden-red hairs.

Female, except for the differences given above, very like the ♂. The mesothorax posteriorly is slightly smoother, and less dull, the longitudinal rugosity of the propodeum extremely short. The second ventral segment of the abdomen, about the middle, has at the most a few somewhat large and very shallow punctures, its surface is excessively finely rugulose, and not very shining; the apical dorsal segment is very narrow, and coarsely punctured. There is a rather conspicuous pale pubescence on the segments preceding the two apical ones.

Hab. Various localities on Hawaii (from 2000—4000 ft.). Not very abundant.

(4) *Nesocrabro daemonius*, sp. nov.

Niger, alis infuscatis, haud evidenter caeruleo-iridescentibus, mesonoto minus opaco, plus minusve flavo-maculato, abdominis segmentis apicalibus pubescentia rufa ornatis, segmento ♀ 2 ventrali nitido, laevissimo, in medio fere impunctato; fronte pilis nigricantibus, tibiis anticis pubescentia brevi et obscura vestitis. ♂♀. Long. 8—12 mm.

Black, the wings infuscate (less so in the ♀), but with little or no blue iridescence. The prothorax and postscutellum usually both bear yellow spots in the ♂, but they are variable in this respect; in the ♀ these spots are much larger, and the scutellum also has a large transverse one, as well as the first and second ventral segments of the abdomen. The latter may also be present in the ♂, as also spots on the scutellum. The apical segments are clothed with golden-red hairs as in *N. rubrocaudatus*, and the preceding segments in the ♀ with dense and fine whitish pubescence. From that species the much less dull surface of the whole insect will readily separate the present one, as well as the much more distinct puncturation of the front of the head and the mesothorax; the surface of the latter in the ♀ being altogether smooth and shining between the punctures. In the ♂ the second ventral segment of the abdomen is densely and distinctly punctured all over, in the ♀ its surface about the middle is nearly or quite impunctate, smooth, and shining.

The fifth dorsal segment of the ♀ is aeneous and very densely punctured. Front of the head, and the front tibiae with dark pubescence, very short on the latter.

Hab. Mountains of Molokai (3000—4000 ft.). Iao Valley, Maui.

(5) *Nesocrabro adspectans.*

Crabro adspectans, Blackburn and Cameron, P. Manch. Soc. Vol. XXV. p. 171 (1885–86).

I have not seen this species. It is very closely allied to *N. daemonius*, but differs from that species in having the front of the head clothed with golden-red pubescence, and long hairs of the same colour on the front tibiae.

HAB. Haleakala, Maui (5000 ft.). A pair were taken by Mr Blackburn 15 or 20 years ago.

(6) *Nesocrabro stygius.*

Crabro stygius, Kirby, Ent. Mo. Mag. XVII. p. 88. Blackburn and Cameron, P. Manch. Soc. Vol. XXV. p. 170 (1885–86).

Niger, alis subhyalinis, vix infuscatis, pronoto ♀ nonnunquam flavo-notato, segmentis ♂ apicalibus pubescentia pallida ♀ pubescentia rufa vestitis. ♂. Long. 8 mm.

This species is very closely allied to *N. rubrocaudatus*, but the ♂ may be at once distinguished by the subhyaline and very faintly infuscated wings, the pubescence of the apical abdominal segments, which is of a pale golden colour, the more distinctly subrugosely punctate front of the head, and the shining surface of its vertex.

From *N. daemonius*, the dull and less smooth surface of the mesothorax and scutellum, the unspotted thorax and the clearer wings, from *N. adspectans*, the obscurely coloured pubescence of the head and front legs (as well as the characters which distinguish it from *N. daemonius*), will readily separate it.

I have not seen an example of the ♀.

HAB. Mountains of Oahu (Blackburn). Head of Pauoa Valley (March 1895).

DIPLOPTERA.

VESPIDAE.

(1) *Polistes aurifer.*

Polistes aurifer, Saussure, Mon. Guêpes Soc. p. 78.

HAB. Very abundant all over the islands. Stylopized examples taken on Lanai and Hawaii.

(2) *Polistes hebraeus.*

Polistes hebraeus, Fab. Mant. Ins. I. p. 292.
Polistes macaensis, Fab. Syst. Piez. p. 272.

Hab. Oahu and Kauai; on the plains. Olaa, Hawaii (2000 ft.).

EUMENIDAE.

This group is represented by a large number of species of the genus *Odynerus,* no less than 86 species being known to me. These *Odynerus* are of great interest and importance, and exhibit a great diversity of structure in the various species, and will no doubt, at some future period, themselves form several distinct genera. In striking contrast to other Hawaiian aculeates (the Mimesidae, Crabronidae, and *Nesoprosopis*) the specific structural characters, (and even the coloration if a few species are excepted), are remarkably constant. These characters are chiefly found in the general sculpture of the insect, the form of the clypeus, the shape of the dorsum of the second segment of the abdomen, but especially in the structure of the ventral plate of this segment. This ventral segment normally consists of three distinct parts, (1) a smaller basal portion, (2) a transverse sulcature traversed by longitudinal costae, (3) a larger apical portion, with a more or less distinct depression. Each of these parts may furnish useful characters; the basal portion in some species is large and tumid, the costae may be of great length, moderate, or entirely obsolete, the apical portion may be flattened to the level of the costae or greatly and perpendicularly raised above them, and the depression may be wide, narrow, deep, or obsolete. The habits of the species are of interest. All those that I have been able to observe prey on the larvae of moths (Pyralidae, Noctuidae, and Micro-Lepidoptera), so that the number of caterpillars destroyed must be immense, especially as the wasps appear to be on the wing at all seasons of the year. Their cells are sometimes formed in the ground, often in the wood of dead trees, and in the case of many species in the cavities of the porous blocks of lava. A few build solitary cells of mud, attached to leaves of trees, but these I have only found when the leaf has been rolled up by a spider, the nest of the latter and the cell of the wasp being fixed side by side. That very abundant species *O. nigripennis* is very partial to houses, forming its cells in cavities in woodwork, or unused locks. It also frequently occupies the empty cells of *Pelopœus.*

All the Hawaiian species of the genus belong to the section formerly known as *Leionotus.* As in the Fossores and Anthophila I have described afresh all the species previously known, whenever I have had specimens for examination, the large number of new forms rendering the old descriptions of little use. The measurements of *Odynerus* are taken from the front of the vertex of the head to the apical margin of the first abdominal segment, instead of to the apical extremity of the abdomen.

(1) *Odynerus venator*, sp. nov.

Niger, minus robustus, fronte inter antennas flavo-maculata, segmenti primi abdominis margine apicali saepe pallido, alis infuscatis et violaceo-iridescentibus. Clypeus leviter dentato-emarginatus. Mesonotum minus fortiter densissime rugoso-punctatum. Segmentum abdominis secundum a basi fortiter elevatum. Long. (a fronte usque ad apicem segmenti 2^{i} abdominis) ♂ 7—9, ♀ 9—12 mm.

Black with a small yellow spot between and just behind the points of insertion of the antennae, and another behind each eye near the vertex; the apical margin of the basal segment of the abdomen often narrowly yellow, or testaceous. Clypeus with the apex dentately emarginate very feebly in the ♀, more strongly so in the ♂; head above the antennae with shallow rugose puncturation. Mesothorax dull, somewhat finely and very closely rugosely punctured; wings infuscate, with violet iridescence. Propodeum quite dull, impunctate or nearly so. Abdomen with the basal segment shallowly punctured, rather more deeply and closely in the ♂ than the ♀; second much raised from the base, the highest point being about one-third the length of the whole segment from the basal margin, finely, evenly and remotely punctured to near the apical margin, where the puncturation becomes close, coarse and shallow, as on the following segments; beneath, with its depression triangular and somewhat deep, meeting the apices of the costae; at the sides the segment is raised from their apices to about the height of its basal portion.

HAB. Hawaii, Kona and Kau districts (2000 to 4000 ft.).

(2) *Odynerus erro*, sp. nov.

Praecedenti forma et puncturatione simillimus, sed thorace toto nitido distinctissimus. ♀. Long. 11 mm. (Plate I. fig. 12.)

Black and shining with a median spot just behind the antennae, another behind each eye near the base, and the sides of the apical margin of the basal segment of the abdomen, pale. Clypeus with the apex dentately emarginate; head above the antennae dull with shallow, close and rugose puncturation. Mesothorax shining; densely, subrugosely punctured, the puncturation consisting of scattered larger punctures (which are not coarse), and a system of smaller punctures which in this species is extremely strongly developed, so that the difference between the two systems is much less than usual; wings with violet iridescence. Propodeum with feeble subobsolete punctures, sometimes hardly visible. Second segment of the abdomen strongly raised from the base, the depression beneath not so deep as in the preceding species. ♀.

HAB. Oahu, Waianae Mts. and coast. Haleakala, Maui (5000 ft.)? A single ♀ only taken in each case. I think it probable that the latter locality is erroneous.

(3) *Odynerus naiadum*, sp. nov.

Niger, alis infuscatis, caeruleo-iridescentibus, fronte, mesopleuris, postscutello (maris etiam pronoto) rubro-notatis; segmento primo abdominis postice rubro-marginato. ♂ clypeus fortiter, ♀ minus fortiter sed distincte dentato-emarginatus. Mesonotum haud nitidum, subtilius subrugoso-punctatum. Abdominis segmentum secundum elevatum; subtus, depressione sat lata et alta. ♂♀. Long. 9—10 mm.

Black, the wings infuscate and with blue iridescence. The front of the head behind the antennae, the mesopleurae, the postscutellum, and in the ♂ the prothorax also, have red markings. The apical margin of the basal segment of the abdomen has a red band, dilated at the sides. Clypeus deeply dentately-emarginate in the ♂, less deeply, but distinctly so in the ♀. Head closely and rugosely punctured. Mesothorax dull, with two systems of puncturation. The larger punctures are not coarse and on the posterior half of the thorax somewhat irregular, the minute interstitial punctures are unusually strong, especially in the ♀, and both kinds have a tendency to run into each other, giving the thorax a subrugose appearance. Propodeum with subobsolete shallow puncturation, the posterior concavity subrugose. Basal segment of the abdomen shallowly punctured; second strongly raised from the base in the ♂, somewhat less so in the ♀; beneath, with the depression distinct and deep.

HAB. Molokai mountains (3000 ft.); local and scarce. Iao Valley, Maui, 1 ♀.

(4) *Odynerus erythrognathus*, sp. nov.

Niger, minus robustus, mandibulis rufis, alis caeruleo-iridescentibus. Clypeus ad apicem depressus, vix emarginatus. Mesonotum opacum sparsim subtilissime punctatum, puncturatione fere obsoleta. Abdominis segmentum secundum elevatum, subtus depressione lata. ♂♀. Long. 8—10 mm.

Black, the mandibles red, the wings with blue iridescence. Apex of clypeus (as in nearly all the Hawaiian species) depressed from the sides, giving it a dentate appearance, very slightly emarginate, or truncate; head above the antennae very dull, with fine feebly impressed punctures. Mesothorax dull, very finely and obscurely punctured, scutellum impunctate or nearly so; wings infuscate with blue iridescence. Propodeum dull, impunctate, or with faint traces of almost obsolete punctures. Basal segment of the abdomen dull, with shallow punctures, second raised from the base but not very strongly, more so in the ♂ than the ♀; beneath, with the depression wide and deep; the segment at the sides, raised up abruptly and rather strongly from the apices of the costae, prominent on either side of the depression at its base.

Hab. Kilauea, Hawaii (4000 ft.).

(5) *Odynerus melanognathus*, sp. nov.

Niger, minus robustus, alis caeruleo-iridescentibus. Clypeus ♂ fortiter, ♀ evidenter dentato-emarginatus. Mesonotum opacum, sparsim subtiliter punctatum. Propodeum puncturatione levissime impressa, fere obsoleta. Abdominis segmentum secundum subtus depressione lata. ♂ ♀. Long. 9—11 mm.

In general appearance very like the preceding, but easily known by the following characters. Mandibles dark, apex of clypeus of ♂ deeply, of ♀ distinctly, though less strongly, dentately-emarginate. Mesothorax rather more distinctly punctured, the propodeum in front with very shallow but evident punctures. Second abdominal segment beneath rather less prominent on either side of the depression in front.

Hab. Kona, Hawaii (1500 ft. and above). Rare. 1♂ 2♀ taken.

(6) *Odynerus cyphotes*, sp. nov.

Niger, alis caeruleo-iridescentibus. Mesonotum opacum subtilissime sparsim punctatum. Segmentum abdominis secundum fortiter subitoque tuberculato-elevatum, subtus depressione minus lata. ♂ ♀. Long. 8—10 mm. (Plate I. fig. 16.)

Mandibles dark, apex of clypeus hardly emarginate, head above the antennae dull, evenly and very shallowly punctured. Mesothorax dull, with fine sparse punctures, sometimes nearly obsolete, and an exceedingly minute and close puncturation between these. Wings infuscate, with blue iridescence. Propodeum sometimes with a very feeble indication of shallow punctures. Abdomen with the basal segment slightly depressed along its apical margin, and shallowly punctured; second very strongly and abruptly raised from the base into a tuberculate form above; beneath, with the depression rather narrow, the segment at the sides rising abruptly from the costae to a height as great or rather greater than that of its basal portion.

Hab. Kona and Kau districts of Hawaii (4000 ft.).

(7) *Odynerus vulcanus.*

Odynerus vulcanus, Blackburn, P. Manch. Soc. Vol. xxv. (1885–86), p. 152.

Niger, alis caeruleo-iridescentibus. Clypeus leviter emarginatus vel subtruncatus. Mesonotum cum scutello peropacum, subaequaliter distincte punctatum. Propodeum (plerumque reticulatim) rugosum. Abdominis segmentum secundum (praecipue maris) fortiter elevatum. ♂ ♀. Long. 8—10 mm.

Black, the mandibles dark, the wings with blue iridescence. Clypeus with the apex depressed and slightly emarginate, sometimes truncate. Front of the head densely and distinctly punctured. Mesothorax with the surface quite dull, somewhat closely and evenly punctured, posteriorly about the middle the punctures generally are sparser. Scutellum dull and distinctly punctured. Propodeum with rugose sculpture generally reticulate. Abdomen with the basal segment closely and largely punctured; second segment strongly and abruptly raised from the base, especially in the ♂; beneath, the depression wide but not deep, so that even at the sides the segment rises not at all strongly from the level of the apices of the costae.

Hab. Hawaii, widely distributed and not rare.

(8) *Odynerus hiloensis*, sp. nov.

Praecedenti simillimus, sed mesonoto minus opaco, densius ac grossius punctato, abdominis segmento secundo subtus minus late depresso distinguendus. ♂ ♀. Long. 7½—10½ mm.

Extremely like *O. vulcanus* but may be known at once by the almost or quite shining surface of the thorax between the punctures. The mesothoracic puncturation is also closer and coarser, and the depression of the second ventral segment evidently less wide.

Hab. Hawaii, not rare on the windward side of the island, in the forests above Hilo (2000 ft.) and at Olaa.

(9) *Odynerus konanus*, sp. nov.

Niger, alis caeruleo-iridescentibus. Clypeus levissime emarginatus vel truncatus. Mesonotum nitidum, distincte aequaliter punctatum. Propodeum rugosum. Segmentum abdominis secundum elevatum, subtus depressione lata, late costarum apices antice attingente. ♂ ♀. Long. 9—11 mm.

Black, the wings with blue iridescence. Clypeus depressed at the apex, slightly emarginate or truncate. Head in front densely and distinctly punctured, shining between the punctures. Thorax shining, mesothorax strongly and evenly punctured, rather more largely and closely in the ♂ than the ♀. Propodeum rugose in front. Abdomen with the second segment raised from the base (more strongly in the ♂); beneath, the depression wide but not deep, meeting the apices of the costae widely at its base.

HAB. Hawaii, Kona district (600 to 2000 ft.). A single example (♀) taken in the mountains of Molokai (3000 ft.) nearly agrees with the Hawaii specimens, as also one from the mountains of West Maui.

(10) *Odynerus orbus*, sp. nov.

Niger, mandibulis rufis, alis caeruleo-iridescentibus. Capitis vertex incrassatus. Clypeus ad apicem depressus, levissime emarginatus. Mesonotum haud nitidum, distincte (nec grosse) punctatum. Propodeum obscure punctatum. Abdominis segmentum 2 a basi elevatum, subtus depressione lata et alta, lateribusque suis post costas subfortiter elevatis. ♀. Long. 10—11 mm. (Plate I. fig. 17 and 17 *a*.)

Black, the mandibles red, the wings with blue iridescence. Clypeus with a depression at the apex, which is very slightly emarginate. Head above the antennae distinctly and closely punctured, the vertex somewhat strongly incrassate. Mesothorax dull, distinctly but not coarsely punctured; scutellum with fine and feeble puncturation. Propodeum with some evident but very feebly impressed coarse punctures. Abdomen with the second segment, raised from the base but not at all abruptly, beneath with the depression wide and deep, the segment at the sides rising abruptly and rather strongly above the apices of the costae.

HAB. Hawaii, Kona (2000 ft. and upwards). Rare. Kilauea (4000 ft.). 1 ♀.

(11) *Odynerus caenosus*, sp. nov.

Niger, alis infuscatis caeruleo-iridescentibus, abdominis segmenti primi et secundi margine apicali flavo-albido. Frons capitis densissime rugoso-punctata. Mesonotum cum scutello fortiter denseque punctatum, subnitidum. Propodeum rugosum. Abdominis segmentum secundum a basi elevatum, subtus depressione haud lata, lateribusque suis abrupte supra costarum apices subfortiter elevatis. Long. 8—9½ mm.

Black, the two basal segments of the abdomen with an apical creamy-white band, the second being the wider of the two. The front of the head is very densely rugosely punctured, the mesothorax coarsely and closely punctured, the surface shining. The propodeum is rugosely sculptured. Basal segment of the abdomen shining, coarsely and closely punctured; the second raised from the base above; beneath, the depression is narrow and hardly meets the apices of the costae, the segment at the sides being abruptly raised from these to about the height of its basal portion.

HAB. Mountains of Kauai. Halemanu and elsewhere on the high plateau.

(12) *Odynerus leucozonias*, sp. nov.

Praecedenti simillimus, et eodem colore, sed mesonoto magis nitido, propodeo laevi (punctato), et abdominis segmento secundo fortius et abruptius elevato, bene distinctus. ♂♀. Long. 8—10 mm.

Very similar to the preceding in form and colour.

The surface of the head in front, the mesothorax and scutellum, are very smooth and shining between the punctures, the system of minute punctures between the larger ones on the mesothorax being hardly observable, instead of very distinct. The propodeum is much smoother, with shallow but distinct punctures, and the second segment of the abdomen is more strongly and abruptly raised from the base.

HAB. Kauai (2000—3000 ft.). Found also on the high plateau.

(13) *Odynerus eludens*, sp. nov.

Praecedenti simillimus, margine apicali segmenti abdominis primi angustissime pallido. Mesonotum nitidum fortiter punctatum, interstitiis evidenter minutissime punctatis. Propodeum laeve, antice sparsim subobsolete punctatum, concavitate fere impunctata. Abdominis segmentum primum (a latere visum) a basi usque ad marginem apicalem aequaliter curvatum. ♀. Long. 9·5 mm.

Allied to the two preceding species but with the basal segment of the abdomen (viewed laterally) more evenly and gradually curved from the petiole—not abrupt in front. The mesothorax is smooth and shining between the punctures as in *O. leucozonias*, but the interstices have the minute system of punctures very evident. The propodeum in front is somewhat shining, with some very feebly impressed punctures; the concavity is smooth and almost impunctate. The pale apical band of the basal segment of the abdomen is unusually narrow; the second segment is considerably, but by no means abruptly, raised from the base, the highest point attained (as seen in lateral view) being rather more than one-third of the whole length of the segment from the base. Beneath, the depression somewhat narrow, deeper than in the two preceding species.

HAB. Halemanu, Kauai (4000 ft.). 1♀.

(14) *Odynerus homochromus*, sp. nov.

Niger, abdomine fasciis duabus albidis, secunda latiore. Mesonotum fortiter punctatum, interstitiis nitidis, distincte punctulatis. Propodeum opacum subobsolete punctatum, concavitate rugulosa, haud evidenter punctata. Segmentum secundum abdominis fere ad medium subfortiter elevatum, subtus depressione distincta. ♂ ♀. Long. 8½—12½ mm.

Black, with two pale bands on the abdomen. Thorax strongly punctured, mesothorax shining between the punctures, the minute system between these quite distinct. Propodeum dull with shallow puncturation in front, the concavity almost or quite impunctate with finely rugulose surface. Abdomen with the basal segment evenly punctured, subvertical in front; second segment raised from the base but not abruptly, the highest point being nearly at its middle; beneath with a distinct and neither very narrow nor deep depression.

HAB. Mountains of Kauai (3000 ft.). Not common.

(15) *Odynerus kirbyi*.

Odynerus kirbyi, Dalla Torre, Wien. Ent. Zeitg. VIII. (1889), p. 125.
Odynerus extraneus, Kirby, Ent. Mo. Mag. XVII. p. 86 (nec de Saussure).
Blackburn and Cameron, P. Manch. Soc. Vol. XXV. (1885–86), p. 151.

Niger, abdomine fasciis duabus albidis ornato, secundo latiore. ♂ clypeo albido, apice emarginato, mandibulis albido-notatis. Mesonotum fortiter denseque punctatum. Propodeum rugosum. Abdominis segmentum primum dense punctatum, secundum subtus costis fortibus et longis, depressione nulla. ♂ ♀. Long. 9—12 mm. (Plate I. fig. 18—18 *b*.)

Black, with two whitish abdominal bands. The ♂ has also the clypeus and more or less of the mandibles of the same colour. The head in front is exceedingly densely punctured, the mesothorax and scutellum are also densely and coarsely punctured, and the surface between the punctures is shining. The entire propodeum is rugose. Abdomen with the basal segment closely punctured, more coarsely in the ♂ than the ♀; second raised from the base rather strongly in the ♂; beneath, the costae are strong and very long and there is no depression beyond their apices.

HAB. Kauai, in the mountains. Not rare.

(16) *Odynerus dilatatipes*, sp. nov.

Praecedenti simillimus, eodem modo ornatus, mesonoto fere opaco minus dense et grosse punctato; propodei concavitate laeviori, tantum rugulosa; tibiis posticis ♂ ad apices fortiter dilatatis, et externe fortiter depressis, bene distinctus. ♂♀. Long. 9½—11 mm. (Plate I. fig. 19.)

Extremely like the preceding in general appearance. Male with the head, above the antennae, more finely and shallowly punctured, as likewise the mesothorax and scutellum. The propodeum is much less rugose; its concavity almost smooth, except for the surface rugulosity. Basal segment of the abdomen with the dorsal and anterior faces meeting less sharply, and less coarsely and closely punctured. Female with the head and thorax evidently more finely punctured, and the surface of the latter dull, or almost dull, between the punctures. The posterior concavity of the propodeum is smoother, and the basal segment of the abdomen more finely punctured. The ♂ is further distinct from any other species by the strongly and suddenly dilated apex of the hind tibiae, the dilated portion outwardly being deeply concave.

Hab. Mountains of Kauai (3000 ft.). Not a common species.

(17) *Odynerus conifer*, sp. nov.

Niger, abdomine fasciis duabus albidis ornato. Mesonotum nitidum sparsim subtilius punctatum. Propodeum rugoso-punctatum. Abdominis segmentum primum supra fortiter transversum, antice truncatum, parte antica parti dorsali acute occurrente; segmentum secundum acute conicum, subtus costis longis, depressione nulla. ♀. Long. 9 mm.

Head closely punctured. Mesothorax smooth and shining, somewhat finely punctured, remotely and irregularly on the posterior half. Between these punctures the minute system of puncturation is very distinct. Propodeum with shallow and somewhat rugose puncturation. Abdomen with the basal segment strongly transverse above, depressed, and distinctly punctured, sharply truncate in front; second segment strongly raised into a sharp cone, beneath the middle costae very long, and no depression beyond their apices.

Hab. Kauai, on the high plateau. A very remarkable and rare species, of which only 1♀ was taken.

(18) *Odynerus kauaiensis*, sp. nov.

Niger, fasciis duabus albidis ornatus. Mesonotum densissime grosse punctatum. Propodeum fortiter rugoso-punctatum. Abdominis segmentum primum ad basim puncturatione grossissima rugosum; secundum haud elevatum; subtus, costis longis; post has triangulariter deplanatum, vix depressum. ♂♀. Long. 8—10 mm.

Apex of clypeus very slightly emarginate or truncate. Mesothorax and scutellum coarsely and closely punctured, the surface between the punctures shining. Propodeum with a coarse rugose puncturation. Basal segment of the abdomen very coarsely punctured towards the brow, less so near the apical margin; second segment simple above, not raised from the base, but with only the ordinary longitudinal convexity; beneath with the costae long, followed by no distinct depression, but usually somewhat flattened triangularly in its place.

Hab. Mountains of Kauai. Not common.

(19) *Odynerus peles*, sp. nov.

Niger, peropacus. Mandibulae fere totae nigrae. Clypeus levissime emarginatus vel truncatus. Capitis et mesonoti puncturatio fere obsoleta. Propodeum rugosum vel rugoso-punctatum. Abdominis segmentum secundum haud elevatum, tantum longitudinaliter convexum; subtus, depressione distincta, minus alta. ♂♀. Long. 6—9 mm.

Male black, the abdomen never with yellow bands. Mandibles dark, the extreme apex sometimes reddish or piceous. Apex of clypeus slightly emarginate or truncate.

Head and thorax very dull, with shallow subobsolete puncturation, sometimes almost invisible. Mesothorax not clothed with a silky pile, but with a very short erect pubescence, easily seen in lateral view. Propodeum rugose, generally more or less reticulately so, the rugosities being apparently the interstices between large shallow punctures, hardly now to be recognized as such. Abdomen dull, the basal segment with very shallow punctures; the second simply convex above, not raised from the base, beneath with the depression somewhat wide at its base but not deep.

Female very like the ♂, with obscure puncturation, the interstices between the punctures of the mesothorax very dull, and the minute punctures thereon not very distinct and somewhat scattered and remote from each other.

Hab. Kona and Kau districts (2000—4000 ft.) of Hawaii. Not a rare species.

Obs. This species greatly resembles the following, but the ♂ is abundantly distinct by the form of the clypeus and the different form of the mesothoracic pubescence. The ♀ may be known by the very slightly emarginate or truncate apex of the clypeus and the different sculpture of the surface of the mesothorax, which in the following has the minute system of punctures very dense and distinct.

(20) *Odynerus sociabilis*, sp. nov.

Niger, ♂ sericeo-pubescens. Margo segmenti primi et secundi (vel unius ex his) apicalis saepe anguste flavus. Mandibulae ex majore parte rufae. Clypeus fortiter dentato-emarginatus. Mesonotum puncturatione obsoleta vel fere obsoleta. Propodeum puncturatione subobsoleta rugosum. Abdominis segmentum secundum subtus depressione lata, minus alta. ♀ minus sericeo-pubescens. Clypeus minus fortiter sed distincte emarginatus. Mesonotum subtiliter remote punctatum (puncturatione nonnunquam fere obsoleta), interstitiis distincte densissime punctulatis. Mandibulae plerumque rufae. ♂♀. Long. 6½—10½ mm. (Plate I. fig. 20.)

Male black, dull, with an appressed sericeous pubescence, often with the apical margin of the first and second abdominal segments narrowly yellow, or with one or other of them so coloured. Mandibles for the most part red. Clypeus very deeply emarginate, the emargination forming rather more than a semicircle. Head above the antennae dull, finely and feebly subobsoletely punctured. Mesothorax and scutellum with an appressed pubescence concealing the surface which is hardly visibly punctured. Propodeum with feeble subobsolete punctures, giving it generally a reticulately rugose appearance in front. Abdomen dull, with sericeous pubescence, and very feebly punctured. Second segment simple above, not raised from the base; beneath with the depression shallow, meeting the apices of the costae widely, the surface dull, somewhat evenly punctured beyond the depression.

Female rather unlike the ♂, much less densely clothed with sericeous pubescence. Mandibles entirely red, or more or less dark. The clypeus, although distinctly dentately-emarginate, is much less deeply so than that of the ♂. Mesothorax dull, with fine sparse punctures, nearly obsolete in some examples, in others more distinct; between these there is an exceedingly close and distinct minute puncturation. Propodeum rugosely punctate as in the ♂. Abdomen less dull, owing to the pubescence being much less dense.

Hab. Mountains of Maui and Hawaii in open localities from 4000—10,000 ft. Common.

(21) *Odynerus scoriaceus*, sp. nov.

Praecedenti cognatissimus. ♂ margine apicali segmentorum 2 basalium flavo, nonnunquam etiam pronoto postscutello, tegulisque flavo-notatis. Mandibulae rufae. Frons dense subgrosse (nec fortiter) punctata. ♂ mesonoto distinctius punctato, ♀ fronte dense distincteque, scutello evidenter subtiliter punctato, discernenda. ♂♀. Long. 7—11 mm.

Very like the preceding which it exactly resembles in form. ♂ with two basal segments apparently always pale along their apical margins. The prothorax, postscutellum and tegulae are also sometimes spotted with yellow; the mandibles are red. The head above the antennae is more largely and closely and less obsoletely punctured, than that of the preceding, the sericeous pubescence of the thorax is less dense and the puncturation larger and more distinct. In the ♀ the mandibles are also red, the head above the antennae is closely and distinctly punctured, the mesothorax is less dull, and more strongly punctured, the minute interstitial puncturation less extremely dense, and the scutellum is sparsely and finely but evidently punctured.

HAB. Kona, Hawaii, on the coast and in the mountains (4000 ft.).

(22) *Odynerus molokaiensis*, sp. nov.

Praecedenti simillimus. Fasciae abdominis ♂ 2 pallidae plerumque plus minusve obsoletae. Pronotum cum tuberculis, tegulae, scutellum, postscutellum, et clypeus nonnunquam flavo-notata, vel haec omnia nigra. ♂♀ fronte fortius punctata; ♀ mesonoto nitido, distinctissime punctato, distinguenda. ♂♀. Long. 7—10 mm.

Extremely like the preceding, of similar form and the mandibles red in both sexes. ♂ with the head in front evidently less shallowly punctured. The abdominal bands are generally more or less obsolete, and in a series of specimens much less evident, than in the preceding species. On the other hand sometimes not only the prothorax, tegulae and postscutellum are marked with yellow, but also the clypeus, the tubercles of the prothorax, and the scutellum. The ♀ is quite distinct by the closely and deeply punctured head in front, and the entirely shining surface of the thorax, with its very distinct puncturation.

HAB. Molokai mountains (3000 ft.).

(23) *Odynerus smithii.*

Odynerus agilis, Smith, J. Linn. Soc. XIV. p. 681 (nec Smith, op. cit. III. p. 164). Blackburn and Cameron, P. Manch. Soc. XXV. p. 162.

Odynerus smithii, Dalla Torre, Wien. Ent. Zeitg. VIII. (1889), p. 124.

Niger, alis minus infuscatis, haud evidenter caeruleo-iridescentibus. Mandibulae nigrae. Frons post antennas flavo-notata. ♂ fasciis duabus abdominis pallidis distinctis, clypeo fortiter emarginato, mesonoto dense aequaliter punctato. ♀ mesonoto opaco, (antice saltem) dense aequaliter punctato; segmento abdominis 2 ventrali post costas levissime (late tamen) depresso. ♂♀. Long. 6½—9½ mm.

Allied to the several preceding species, but of smaller average size. Black, with a small median yellow spot just behind the antennae. The mandibles are dark. The ♂ has the two basal segments of the abdomen distinctly bordered with yellow along their apical margins, and they are obscurely and very narrowly pale in the single ♀, which I have examined.

♂ clypeus deeply emarginate, head above the antennae dull, closely punctured. Thorax black, entirely dull; mesothorax without sericeous appressed pubescence, closely, evenly, and distinctly punctured, the interstices with a dense minute puncturation. Scutellum with a very similar puncturation. Propodeum rugose from large subobsolete punctures.

♀ with the head above the antennae closely punctured, the interstices with very distinct minute puncturation. Mesothorax dull, closely and evenly punctured at least on the front half, the minute system of punctures between the larger ones, very dense and distinct. Scutellum more finely, but distinctly punctured. Propodeum as in the ♂. Basal segment of the abdomen with shallow even puncturation, second simple above, beneath, with the depression wide at the base but very faint.

Hab. Lanai, on the coast, and Wailuku, Maui.

The specific name 'agilis' given to this species by Smith had already been used by him for a species of the same genus found in the Aru Islands.

(24) *Odynerus nubicola*, sp. nov.

Niger, opacus, alis subhyalinis, vix iridescentibus; frons cum pronoto plerumque flavo-notata. Abdominis segmentum primum et secundum margine apicali flavo. Clypeus leviter emarginatus. Mesonotum opacum, antice subaequaliter, post medium sparsim, obscure punctatum. Abdominis segmentum secundum haud elevatum, subtus depressione levissima, nonnunquam fere obsoleta. ♂♀. Long. 7—9 mm. (Plate I. fig. **21** and **21** *a*.)

Black, a median spot behind the antennae, two on the prothorax (rarely absent), and the apical margin of the two basal abdominal segments, yellow. Mandibles dark. Clypeus in both sexes emarginate at the apex, but not deeply, very convex longitudinally. Head above the antennae dull, especially in the ♂, with both systems of puncturation evident. Mesothorax very densely and finely punctured between the larger punctures, which are very shallow and subobsolete, and still further obscured in the ♂ by the appressed fuscous pubescence. The larger punctures themselves are sparse and irregular on the posterior half of the mesothorax, but more regular in front. Abdomen with the basal segment coarsely and shallowly subrugosely punctured; second simply convex above, beneath, with the depression very feeble, often hardly evident except for a median longitudinal impressed line, the segment rising from the apices of the costae only with the slight convexity of its surface. The wings in both sexes are subhyaline with hardly any iridescence.

Hab. Haleakala, Maui. Common above the forest belt up to the summit, and also within the crater.

(25) *Odynerus ecostatus*, sp. nov.

Niger et nitidus, alis caeruleo-iridescentibus. Mandibulae ex majore parte rufae. Clypeus vix emarginatus. Mesonotum antice aequaliter, postice circa medium sparsim, distincte punctatum. Abdominis segmentum primum minus dense punctatum; secundum a basi elevatum, subtus, costis obsoletis, (vel fere obsoletis), sulco nitido. ♂♀. Long. 8—10 mm. (Plate I. fig. 22 and 22 *a*.)

Black and shining, the wings dark with bright blue iridescence. Mandibles for the most part red. Clypeus very slightly emarginate in the ♂, the head above the antennae densely punctured. Mesothorax shining, with distinct regular punctures in front, which posteriorly towards the middle become scanty. Scutellum punctured, more largely in the ♂ than the ♀; propodeum smooth and punctured. Abdomen shining, basal segment very distinctly, but not densely punctured; the second raised from the base but not abruptly; beneath with the costae obsolete or nearly so, the sulcature very shining, the depression meeting it rather widely, and the sides of the segment rather abruptly raised from it, though not strongly, hardly attaining the height of its basal portion.

HAB. Molokai, Lanai and Maui, in the mountain forests (2000—4000 ft.).

(26) *Odynerus montanus.*

Odynerus montanus, Smith, J. Linn. Soc. XIV. p. 680. Blackburn and Cameron, P. Manch. Soc. XXV. p. 158.

Niger, subnitidus, alis caeruleo-iridescentibus. Clypeus vix emarginatus. Mesonotum subnitidum, distincte minus dense punctatum. Propodeum opacum et rugosum. Abdominis segmentum secundum plus minusve (♂ subfortiter) elevatum; subtus, depressione lata, minus alta. ♂♀. Long. 7—11 mm.

Black, somewhat shining, wings dark and brightly iridescent. Clypeus hardly emarginate at the apex. Head above the antennae deeply, closely and distinctly punctured (rather more largely in the ♂). Mesothorax rather shining, distinctly but not coarsely punctured, somewhat remotely in the ♀, more closely and rather more largely in the ♂. The minute interstitial puncturation is shallow and not dense, but very evident. Propodeum dull or nearly so, and rugose. Abdomen with the basal segment distinctly and evenly punctured; second raised from the base, more strongly but not very abruptly in the ♂; beneath, with the depression shallow, but rather wide; the costae well developed.

HAB. Oahu, on the coast and in the mountains.

(27) *Odynerus unicus*, sp. nov.

♂ niger, nitidus, alis caeruleo-iridescentibus. Clypeus levissime emarginatus. Frons minus fortiter punctata. Mesonotum subnitidum, sparsim subtiliter punctatum. Propodeum laeve, antice (ad latera) impunctatum, concavitate sparsim minus fortiter

punctata. Abdominis segmentum secundum elevatum; subtus, costis subobsoletis, a sulco fortiter elevatum, depressione angustula, minus alta. ♂. Long. 7 mm.

Black, shining, wings dark with blue iridescence. Clypeus very slightly emarginate at its apex; head above the antennae rather finely and shallowly punctured. Mesothorax with fine sparse and irregular punctures, between which the minute system is evident, but not dense. Propodeum smooth, impunctate in front, the posterior concavity with some very shallow punctures. Basal segment of the abdomen, viewed laterally, forming an almost even curve from the petiole to the hind margin, above somewhat irregularly and shallowly punctured. Second segment raised from the base; beneath, the depression neither very wide nor deep, the costae subobsolete, and the segment rising at the side from their apices to a height rather greater than that of its basal portion. ♂.

HAB. Mountains near Honolulu. 1 ♂, March 1897.

(28) *Odynerus camelinus*, sp. nov.

Niger, fronte post antennas rubro-notata, tegulis rubris; ♂ clypei apice, mandibulis, pronoto et postscutello nonnunquam rubro-notatis; alis caeruleo-iridescentibus. ♂ clypeus fortiter, ♀ levissime emarginatus. Caput post antennas opacum, distincte punctatum. Mesonotum vix nitidum, sparsim subtiliter obscurius punctatum, densissime etiam et minutissime punctulatum. Abdominis segmentum primum fere impunctatum, secundum fortiter elevatum, coniforme; subtus depressione lata, leviter impressa. ♂♀. Long. 7—10 mm. (Plate I. fig. 23 and 23*a*.)

Black, a median spot behind the antennae and the tegulae red. In the ♂ some or all of the following parts are also of this colour; the mandibles, the apex of the clypeus, the apex of the anterior and intermediate femora, the prothorax in front and part of the postscutellum.

Clypeus of ♂ deeply, of ♀ slightly emarginate at the apex. Head above the antennae distinctly punctured, the interstices with very distinct minute puncturation. Mesothorax scarcely shining, very feebly and sparsely punctured, with a very minute and close puncturation between the larger punctures. Propodeum almost dull, smooth and scarcely punctured. Abdomen with the basal segment strongly transverse, with very feeble, ill-defined, and sparse punctures; second segment strongly raised from the base into a conical form; beneath, with the depression wide and very shallow, in the middle the surface depressed even a little below the level of the apices of the costae.

HAB. Molokai Mts. (2000—4000 ft.). Maui, Iao Valley, above Lahaina, and on Haleakala.

(29) *Odynerus dromedarius.*

Odynerus dromedarius, Blackburn, P. Manch. Soc. XXV. (1885–86), p. 151.

Praecedenti cognatissimus, sed tegulis atris: mesonoto magis opaco. ♂ apice tibiarum et clypei, mandibulis pronoto et postscutello nunquam rufo-notatis. ♂♀. Long. 8—9 mm.

Differs very little from the preceding except in colour. The ♂ has no red markings except the small median spot behind the antennae and those behind the eyes. In the ♀ the former is sometimes absent and in both sexes the tegulae are always dark.

The surface of the thorax is rather more dull, the minute system of punctuation being rather more dense, and generally the puncturation, especially of the scutellum, is slightly better defined.

HAB. Kona, Hawaii (3000—4000 ft.). Kilauea (4000 ft.).

(30) *Odynerus oahuensis*, Dalla Torre.

Odynerus diversus, Blackburn, P. Manch. Soc. XXV. p. 161 (nec Walker).

Odynerus oahensis (sic), Dalla Torre, Wien. Ent. Zeitg. VIII. (1889), p. 124.

Niger, alis ex majore parte subhyalinis, haud caeruleo-iridescentibus. Frons, pronotum, tegulae, mesopleurae, scutellum, et postscutellum rubro-notata. Abdominis segmentum primum et secundum postice rubro-marginata, hujus etiam lateribus rubro-maculatis. Segmenta caetera etiam saepe plus minusve rubro-marginata.

♂ clypeo fortiter, ♀ vix emarginato. Mesonotum subnitidum, fortiter punctatum. Propodeum laeve, parce subobsolete punctatum. Abdominis segmentum primum fortiter transversum: secundum convexum, haud a basi elevatum, lateribus fortiter rotundatis; subtus post costas late triangulariter deplanatum, vix depressum, costis distinctis. ♂♀. Long. 8—10 mm.

Black, with a red median spot behind the antennae and another behind each eye. The prothorax, tegulae, mesopleurae, scutellum and postscutellum are spotted with red. The apical margin of the first and second abdominal segments as well as the sides of the latter are of the same colour, and some of the following segments are more or less red along their apical margins.

Clypeus of ♂ strongly, of ♀ hardly emarginate. Head above the antennae coarsely and very closely punctured. Mesothorax rather more largely but not quite so closely. Scutellum sparsely punctured. Propodeum with the surface smooth, bearing some very shallow punctures. Abdomen with the basal segment strongly transverse above; second strongly convex longitudinally, but not raised, its sides strongly rounded; beneath, widely flattened beyond the costae, hardly depressed, not raised up from their apices even at its sides, the costae themselves well developed. Wings subhyaline, the front pair infuscate along the anterior margin, but without any blue iridescence.

HAB. Oahu, both mountain ranges. Not common.

(31) *Odynerus rudolphi.*

Odynerus cardinalis, Blackburn, P. Manch. Soc. XXV. p. 158 (nec Morawitz).
Odynerus rudolphi, Dalla Torre, Wien. Ent. Zeitg. VIII. (1889), p. 124.

Niger, nitidus, alis purpureo-iridescentibus. Clypeus vix emarginatus. Mesonotum sparsim subtiliter sed distincte punctatum. Propodeum laevissimum. Abdominis segmentum secundum ventrale haud supra costarum apices ad latera elevatum, costis fortibus, depressione nulla. ♂♀. Long. 7—9 mm. (Plate I. fig. 24 and 24 *a*.)

Deep black and shining, generally with a minute yellow spot behind the antennae and another behind each eye near the vertex. Wings infuscate with extremely bright iridescence.

Clypeus hardly emarginate at the apex; head above the antennae distinctly but not so very closely punctured. Mesothorax finely remotely and distinctly punctured, the surface very highly polished, and the minute system of punctures extremely feeble and almost obsolete. Propodeum very smooth, shining, and with at the most a few very fine punctures. Abdomen with the basal segment, seen from the side, evenly curved from the petiole to the hind margin; second segment strongly convex longitudinally; beneath flat, with no distinct depression, the costae strong, and the segment at the sides not rising up from their apices.

HAB. Mountains and coast of Oahu. Not rare.

(32) *Odynerus brevicostatus*, sp. nov.

♂ niger, mandibulis rufis, alis nitide fuscis, margine antico tantum purpureo-iridescente. Clypeus vix emarginatus. Mesonotum subnitidum, inaequaliter subtiliter punctatum. Propodeum nitidum fere impunctatum. Abdominis segmentum secundum fortiter convexum (haud elevatum); subtus, depressione definita nulla, costis brevissimis, parte sua basali permagna et tumida. ♂. Long. 6½ mm.

♂ black, with the mandibles red, wings infuscate with a purple iridescence. Clypeus truncate at the apex. Mesothorax shining, irregularly, sparsely, and finely punctured, with the minute system of punctures between these larger ones very distinct. Propodeum smooth and shining, hardly punctured. Abdomen shining, basal segment remotely punctured; second not raised from the base except by its longitudinal convexity, which is strong; beneath, with extremely short costae, the basal portion of the segment in front of these very greatly developed, tumid and shining; beyond the costae the segment is nearly flat, not at all raised from their apices, and without any definite depression.

Hab. Molokai mountains (3000 ft.). 1 ♂ taken.

(33) *Odynerus eupteryx*, sp. nov.

♂ praecedenti simillimus, niger, mandibulis atque clypei apice rufis, alis caeruleo-iridescentibus. Clypeus levissime emarginatus. Frons opaca, puncturatione fere obsoleta. Mesonotum opacum subobsolete punctatum. Propodeum dense minutissime rugulosum, opacum, fere impunctatum. ♂. Long. 7½ mm.

Closely allied to the preceding, having the second ventral segment of the abdomen very similarly formed, but with the costae rather longer and the tumid basal portion of the segment less shining. Otherwise it may easily be distinguished by the following characters. The extreme apex of the clypeus is red, as well as the mandibles, the head above the antennae is very obscurely punctured, the thorax quite dull, the larger system of punctures very feebly impressed, and the minute system much less distinct. The propodeum dull, with a very minute and dense surface rugulosity. The wings are darker with a bright blue iridescence.

Hab. Molokai mountains (3000 ft.). 1 ♂ taken.

(34) *Odynerus purpurifer*, sp. nov.

Niger, nitidus, mandibulis clypeique apice rufis; alis fuscis, purpureo-iridescentibus. Clypeus dentato-emarginatus. Mesonotum nitidum, subtilius minus dense punctatum. Propodeum nitidum, sparsim subobsolete punctatum. Abdominis segmentum secundum (praecipue ♂) subelevatum; subtus, post sulcum transversum fortissime elevatum, costis subobsoletis. ♂♀. Long. 7—11 mm. (Plate I. fig. 25 and 25*a*.)

Black and shining, the mandibles and apex of clypeus red, wings shining fuscous with purple iridescence. Head above the antennae closely and distinctly punctured, the vertex in the ♀ somewhat incrassate. Mesothorax with scattered punctures, the surface between them with the minute system very distinct, but not dense. Propodeum in front shining, with a few feebly impressed punctures. Abdomen with the basal segment not densely punctured; second raised from the base in the ♂, but not strongly or abruptly, and still less so in the ♀, beneath, the costae obsolete or nearly so, the sulcature shining, and the part of the segment beyond it strongly and abruptly raised to a height greater than that of its basal portion, its depression narrow but deep in front.

Hab. Molokai mountains (3000—4000 ft.). Mountains of West Maui in the Iao Valley, and above Lahaina (3000 ft.). Lanai (2000 ft.).

(35) *Odynerus instabilis*, sp. nov.

Niger, mandibulis rufis, alis infuscatis caeruleo-iridescentibus. Caput densissime punctatum. Mesonotum subfortiter punctatum, ♀ postice irregulariter, interstitiis crebre minutissime punctulatis. Propodei concavitas punctata. Abdominis segmentum secundum basi subfortiter elevatum, subtus, post sulcum fortiter elevatum, depressione angusta sat distincta.

Var. Tegulis rufis vel piceis. ♂♀. Long. 7—9·5 mm.

This species is very variable but quite distinct from any other. The surface in some examples is quite dull, (especially in examples from Molokai), while in others it is very shining. The mandibles are red, the head above the antennae densely, but not very deeply punctured. The mesothorax is distinctly punctured, rather more coarsely in the ♂, and somewhat sparsely and irregularly on the posterior portion in the ♀. The propodeum is not rugose, but the posterior concavity is punctured. The second segment of the abdomen is distinctly raised from the base; beneath, it rises up very strongly from the sulcature to an elevation much greater than its basal portion, and there is a narrow but very distinct median depression. The wings are dark, and have a blue iridescence. In examples from Maui the tegulae are generally red, but in a few examples they are dark, as in the Lanai and Molokai specimens.

Hab. Molokai, Lanai, and Maui, in the mountain forests (2000—5000 ft.).

(36) *Odynerus deinogaster*, sp. nov.

Niger, subnitidus, fronte, pronoto, et nonnunquam postscutello rubro-notatis, alis infuscatis, caeruleo-iridescentibus. Caput, mesonotum, concavitasque propodei dense fortiter punctata. Abdominis segmentum primum dense punctatum; secundum supra convexum, haud a basi elevatum, subtus, sulco transverso nitidissimo, post sulcum fortissime abrupte elevatum, costis et depressione obsoletis. ♂♀. Long. 7—8 mm. (Plate I. fig. 26 and 26 *a*.)

Black, with a spot behind the antennae, the prothorax in front and sometimes the postscutellum, red. Abdomen entirely black. Wings infuscate and with a blue iridescence. Clypeus hardly emarginate at the apex; head above the antennae densely punctured. Mesothorax with a somewhat coarse and close puncturation, the surface somewhat shining and the system of minute punctures evident. Abdomen with the basal segment closely and distinctly punctured; second simply convex longitudinally above; beneath, the sulcature shining, without any costae, and the part of the segment behind it very strongly and abruptly raised, subprominent in the middle in front, the depression wanting.

Hab. Molokai mountains (3000 ft.). Rare. 2 ♂ 2 ♀ taken.

(37) *Odynerus homœogaster*, sp. nov.

Praecedenti forma similis, sed antennarum articulo basali antice, et margine segmenti primi abdominis postice, rubris. ♂♀. Long. 8—9 mm.

Perhaps only a subspecies of the preceding, but readily distinguished by the red line on the scape of the antennae in front, and the red apical margin of the basal abdominal segment. In the ♀ the abdominal band is interrupted, and less conspicuous than that of the ♂.

Hab. Iao Valley, Maui. 4 ♂ 1 ♀.

(38) *Odynerus heterochromus*, sp. nov.

Niger, opacus, alis caeruleo-iridescentibus. Abdominis segmentum secundum ut in O. homœogasteri fere formatum. Thorace opaco et colore bene distinguendus.

Var. ♂. Segmentum abdominis basale postice flavo marginatum. ♂♀. Long. 6½—8½ mm.

Black, ♂ very rarely with the apical margin of the basal segment of the abdomen pale, and sometimes with a small pale median spot just behind the antennae.

Apex of the clypeus slightly dentately emarginate; head above the antennae dull with shallow and very close puncturation. Mesothorax dull, rather coarsely punctured in the ♂, in the ♀ the punctures are finer, sparser and less distinct. Scutellum in the ♂ closely punctured, less closely and much more finely in the ♀. Propodeum towards the sides in front rough with large shallow feebly impressed punctures. Abdomen with the basal segment closely, but not deeply, punctured; second segment above not raised from the base; beneath, exceedingly strongly raised from the sulcature, the costae subobsolete, and the depression wanting, or represented only by a faint longitudinal impressed line.

Hab. Kilauea, Hawaii (4000 ft.). Common; burrows in dead tree trunks. I did not meet with it on the leeward side of the island.

(39) *Odynerus mimus*, sp. nov.

Forma fere praecedentis, niger, abdominis segmentis duobus basalibus postice albido-marginatis, alis infuscatis caeruleo-iridescentibus. Mesonotum nitidum, dense fortiter punctatum. Abdominis segmentum secundum supra haud elevatum, leviter convexum; subtus, post sulcum fortissime elevatum, costis subobsoletis, depressione nulla. ♂♀. Long. 7½—9 mm.

Not a large species, agreeing for the most part in form with the preceding. Black, with the apical margins of the first and second abdominal segments yellowish-white. The first band narrow, the second much wider.

Head and mesothorax densely and coarsely punctured, the surface of the latter shining between the punctures. Propodeum with the surface smooth and shallowly punctured. Basal segment of the abdomen evenly punctured; second simple above, slightly convex longitudinally; beneath, extremely strongly and abruptly raised from the sulcature (the greatest height attained being at the middle), the costae more or less obsolete, the depression wanting, or represented only by an impressed line.

HAB. Mountains of Kauai (3000 ft.).

(40) *Odynerus pseudochromus*, sp. nov.

Niger, capitis fronte, pronoto, mesopleuris, tegulis (saepe), scutello, et postscutello rubro-notatis. Abdominis segmentorum margines apicales, (duorum basalium distinctissime), rubri. Alae fere hyalinae, marginibus anticis et apicalibus infuscatis. Mesonotum cum scutello dense fortiter punctatum. Abdominis segmentum secundum minus elevatum, fortiter convexum; subtus, fortissime post sulcum elevatum, depressione distincta, minus lata. ♂♀. Long. 6—8½ mm. (Plate I. fig. 27 and 27 *a*.)

Black, with a median spot behind the antennae, another behind each eye, the prothorax in front, a spot on the mesopleurae, a small one on the mesothorax near the tegulae, one or more spots on the latter, part of the scutellum and postscutellum, the hind margins of most of the abdominal segments (the first and second most widely), and a line on the scape of the antennae of the ♂, red. These markings vary a little but are for the most part constant. Wings nearly clear, except along the margin, and with no trace of blue iridescence.

Apex of clypeus with a depression, but hardly emarginate. Mesothorax coarsely and densely punctured, the scutellum closely but rather less coarsely. Propodeum with shallow puncturation. Basal segment of the abdomen densely punctured; second somewhat strongly convex, especially in the ♂; beneath very strongly and abruptly raised behind the sulcature, the costae ill defined, subobsolete, the depression very distinct, deep in front, the segment prominent on either side of it.

HAB. Mountains of Oahu, both ranges.

OBS. This species has a most remarkable resemblance superficially to *O. oahuensis*. It is less robust and lacks the red spot on the sides of the second segment of the abdomen. The second ventral segment is as different as it well can be, and there are other important structural differences, so that I believe the two species are not really at all closely related; yet their general appearance is extremely similar, and unlike other Hawaiian species.

(41) *Odynerus leiodemas*, sp. nov.

Praecedenti simillimus, eodem modo rubro-notatus, sed angustior. Mesonotum minus dense punctatum, scutello sparsius ac subtilius. Abdominis segmentum secundum subtus minus fortiter post costas elevatum. ♀. Long. 7½ mm.

This species is exactly like the preceding in its markings and the colour of the wings, but is evidently narrower in form. The mesothorax is more finely and less regularly punctured and more shining, the scutellum more finely and sparsely. The second segment of the abdomen more strongly convex at the base longitudinally (when seen from the side), while beneath it is evidently less strongly raised from the sulcature.

HAB. Waianae mountains, Oahu. A single ♀ taken.

(42) *Odynerus laevisulcatus*, sp. nov.

Niger, nitidus, alis infuscatis caeruleo-iridescentibus, forma gracili. Clypeus vix emarginatus. Capitis vertex subincrassatus; frons densissime punctata. Mesonotum nitidum, antice aequaliter, postice ad medium subsparsim, fortiter punctatum. Propodeum laeve, concavitate sua dense punctata. Abdominis segmentum secundum subelevatum vel fortiter convexum; subtus, post sulcum transversum, ad altitudinem partis suae basalis (vel magis alte) elevatum, depressione angusta distinctissima, sulco ipso nitido, costis fere obsoletis. ♀. Long. 7—8 mm.

Female black, wings infuscate, with blue iridescence. Apex of clypeus hardly emarginate. Head above the antennae very closely punctured, the vertex incrassate. Mesothorax strongly punctured, evenly in front, posteriorly, at least about the middle, somewhat sparsely. The puncturation of the scutellum is also very distinct, but finer than that of the mesothorax. Propodeum with the surface smooth and shining, distinctly but not deeply punctured, densely so in the posterior concavity. Abdomen shining, basal segment with distinct nearly even puncturation; second somewhat raised from the base, or at least very strongly convex; beneath, raised above the sulcature to a height rather greater than that of its basal portion, the sulcature itself shining, with indistinct, nearly obsolete costae, the depression narrow but very distinct.

HAB. Haleakala, Maui (5000 ft.). Two ♀ taken in the early part of 1894; probably rare, as it was not met with again on several subsequent visits.

(43) *Odynerus xanthorhoes*, sp. nov.

Niger, nitidus, alis fuscis, nitidissimis. Abdomen fasciis duabus ferrugineo-flavis. Frons, pronotum, mesopleurae, tegulae plerumque, postscutellum, tibiaeque omnes (plus minusve), eodem colore decorata. Mesonotum (♀ praecipue) remote punctatum, minutissime etiam et dense punctulatum. Propodeum fortiter rugosum. Abdominis segmentum primum ad basim grossissime punctatum; secundum in formam conicam fortiter elevatum. ♂♀. Long. 8—9 mm.

Black, with a median spot behind the antennae, another behind each eye, part of the prothorax, a spot on the mesopleurae, the tegulae more or less, the postscutellum in front, the hind margin of the two basal abdominal segments, all the tibiae more or less, of an orange-yellow colour. Mesonotum shining, the system of larger punctures distinct but not coarse, and on the posterior half the puncturation is sparse and irregular. In the ♀ these punctures are finer than in the ♂ and much more sparing, the system of minute punctures occupying the greater part of the surface. Propodeum with coarse rugose sculpture. Abdomen shining, basal segment very coarsely punctured towards the base; second raised near the base into a conical form; beneath beyond the sulcature also raised to a height equal to, or slightly greater than, that of its basal portion, the depression short and narrow, but distinct.

HAB. Mountains of Kauai (2500—3000 ft.). Local.

(44) *Odynerus nivicola*, sp. nov.

Niger, alis infuscatis, caeruleo-iridescentibus, abdominis segmentis duobus basalibus flavo-marginatis. Clypeus distincte emarginatus. Mesonotum plus minusve nitidum, irregulariter punctatum, interstitiis dense subtilissime punctulatis. Propodeum opacum et rugosum. Abdominis segmentum secundum (praecipue maris) abrupte elevatum; subtus, post sulcum fortiter elevatum, depressione angustula. ♂♀. Long. 6—9 mm.

Black, the wings with blue iridescence, the apical margins of the two basal segments of the abdomen pale yellow.

Clypeus distinctly emarginate at the apex; the head above the antennae closely and distinctly punctured. Mesothorax more or less shining, sparsely irregularly and not coarsely punctured (in the ♀ generally more finely and sparsely than in the ♂); between these punctures with a fine and close punctuation, which is generally clearer in the ♀ than in the ♂. Propodeum dull, and more or less rugose towards the sides. Basal segment of the abdomen with shallow punctures; second abruptly and rather strongly raised from the base; beneath, finely punctured, and abruptly raised from the apices of the costae, the depression narrow.

HAB. Haleakala, Maui. In the higher forest, and above it to an elevation of 8000 ft., and also in the summit crater.

(45) *Odynerus dryas*, sp. nov.

Niger, alis infuscatis, caeruleo-iridescentibus, capite, thorace et abdomine rufo-notatis. Pronotum rufo-maculatum. Abdominis segmentorum 2 basalium apices rufo-marginati. Mesonotum nitidum, sparsim irregulariter punctatum. Abdominis segmentum secundum elevatum; subtus depressione sat lata. ♂♀. 7—8 mm.

Black, the wings infuscate and with blue iridescence. A median spot on the head behind the antennae, two large ones on the prothorax, one below each of the tubercles, sometimes one on each of the tegulae, the postscutellum, two spots sometimes on the scutellum, the propodeum more or less at the sides, of a bright red colour. Basal segment of the abdomen with an apical red band strongly dilated at the sides, and the apical margin of the second of the same colour.

Mandibles black. Clypeus very slightly dentately-emarginate; head above the antennae closely punctured. Mesothorax smooth and shining, somewhat finely irregularly punctured, the surface between these punctures with very minute but quite evident punctuation; scutellum sparsely punctured; propodeum with the posterior concavity closely punctured. Abdomen with the basal segment coarsely and evenly punctured; second raised from the base but not very strongly; beneath, at the sides, raised from the apices of the costae to about the height of the basal portion of the segment, the depression wide but not deep.

HAB. Haleakala, Maui, 5000 ft. 3 ♂ 1 ♀.

(46) *Odynerus erythrostactes*, sp. nov.

Niger, alis infuscatis, caeruleo-iridescentibus, fronte, pronoto, tegulis, mesopleuris et postscutello rubro-notatis. ♂ tibiis anticis saepe, intermediis posticisque rarius, articuloque basali antennarum plus minusve, rubro-lineatis. Abdominis segmentum *primum postice rubro-marginatum. ♂is clypeus leviter, ♀ae vix emarginatus. Mesonotum subnitidum, distincte punctatum. Propodeum rugosum. Abdominis segmentum secundum fortiter elevatum, lateribus subcompressis; subtus, depressione post costas distincta, minus alta.* ♂♀. *Long.* 7—10·5 mm.

Black, the wings infuscate and with blue iridescence. A median spot behind the antennae, one on either side of the prothorax, nearly united, one or more on the tegulae, one on the mesopleurae, the postscutellum in front, and the hind margin of the basal segment of the abdomen, red. In the ♂ the front tibiae usually, sometimes the intermediate, and rarely the posterior are more or less red, as also a longer or shorter line on the scape of the antennae.

Clypeus of ♂ dentately-emarginate but not deeply. Head above the antennae closely and rugosely punctured. Mesothorax distinctly punctured, less closely and regularly behind than in front, between these punctures with a distinct minute puncturation, the surface more or less smooth and shining. Propodeum rugose. Abdomen with the basal segment largely punctured; second very finely and remotely, except towards the apical margin, strongly raised from the base in both sexes, its sides somewhat compressed; beneath, with the depression distinct, but shallow, rather deeper in the ♀ than in the ♂, the segment at the sides not at all strongly raised from the apices of the costae.

Hab. Molokai mountains (3000 ft.). Iao Valley, Maui, 2 ♂ not quite typical, having the apical margin of the second abdominal segment red at the sides, and below the average size of the species.

(47) *Odynerus montivagus*, sp. nov.

Niger, alis infuscatis, caeruleo-iridescentibus. Caput nigrum, mandibulis rufis. Pronotum rubro-notatum. Abdominis segmentum primum margine apicali late rubro; secundum utrinque rubro-maculatum. Mesonotum subnitidum, distincte punctatum. Propodeum laeve, fere impunctatum. Abdominis segmentum 2 ventrale depressione angustula. ♂♀. *Long.* 6—7 mm.

Black, the mandibles red. Prothorax with red markings, the rest of the thorax black. Apical margin of the basal segment of the abdomen with a wide red band, second segment with a red spot on either side.

Clypeus distinctly dentately-emarginate at the apex (but not deeply) in the ♂, less distinctly so in the ♀. Head above the antennae more or less shining, very closely and distinctly punctured. Mesothorax and scutellum not coarsely, but somewhat deeply and remotely punctured; propodeum almost smooth, slightly shining, and nearly impunctate. Basal segment of the abdomen hardly shining, with irregular shallow puncturation; second segment rather abruptly, but not very strongly, raised from the base; on its ventral surface it rises strongly and abruptly from the apices of the costae, its depression short and narrow and rather deep in front.

Hab. Molokai mountains (3000—4000 ft.). 1 ♂ 1 ♀. Iao Valley, Maui. 1 ♀.

(48) *Odynerus microdemas*, sp. nov.

Niger, alis infuscatis, caeruleo-iridescentibus, fronte, pronoto, mesopleuris, post-scutello, lateribusque propodei rubro-notatis. Abdominis segmentum primum ex majore parte rubrum; secundum ad latera nonnunquam rubro-maculatum.

Caput supra antennas nitidum, dense punctatum. Mesonotum laeve, grosse fortiterque punctatum. Abdominis segmentum secundum minus elevatum, subtus depressione angustula. ♂♀. Long. 5—7 mm.

Black, the wings dark, with blue iridescence. The front of the head, the prothorax, the mesopleurae, postscutellum and sides of the propodeum have red markings. The basal segment of the abdomen is red over the greater part of its surface, and the second is sometimes spotted at the sides.

Head above the antennae closely coarsely and shallowly punctured, the apex of the clypeus hardly emarginate. Mesothorax coarsely punctured, the surface smooth between these punctures and almost (or quite) without the minute interstitial puncturation. Abdomen with the second segment not much raised from the base, shining and shallowly punctured; seen from beneath, its ventral surface is somewhat strongly raised from the costae at the sides, and even in the middle the depressed portion, where it meets these, rises up convexly from their apices; the depression itself not very wide.

Hab. Molokai mountains (3000 ft.).

(49) *Odynerus monobius*, sp. nov.

Niger, alis infuscatis, caeruleo-iridescentibus, fronte, pronoto, mesopleurisque rubro-maculatis; abdominis segmento primo postice interrupte rubro-marginato. Clypeus levissime dentato-emarginatus. Caput supra antennas laeve, distincte punctatum. Mesonotum subfortiter et irregulariter, propodeum in concavitate sua dense punctatum. Abdominis segmentum primum dense et grosse punctatum; secundum evidenter elevatum; subtus, ad latera minus fortiter sed abrupte supra costarum apices elevatum, depressione costis oblique occurrente. ♂. Long. 6 mm.

Male black, wings infuscate, with blue iridescence. A median spot behind the antennae, the prothorax in front, a spot on the mesopleurae, and the apical margin of the basal abdominal segment narrowly, red. Head above the antennae smooth, and somewhat largely punctured. Mesothorax irregularly punctured, the punctures closer in front and much sparser posteriorly, the surface smooth with minute interstitial puncturation visible, but by no means distinct. Propodeum with the concavity densely punctured. Basal segment of the abdomen coarsely, closely, and rugosely punctured; second evidently, but not very strongly, raised from the base; beneath, the depression shallow, the segment at the sides abruptly raised above the apices of the costae, to a height about equal to that of its basal portion.

HAB. Mountains of Molokai (3000 ft.). 1 ♂.

(50) *Odynerus rubritinctus.*

Odynerus rubritinctus, Smith, J. Linn. Soc. XIV. p. 679. Blackburn and Cameron, P. Manch. Soc. Vol. XXV. p. 155.

Odynerus sandwichensis, Dalla Torre, Cat. Hym. Fam. Vesp. (nec Saussure).

Niger, pronoto nigro, fronte, tegulis, mesopleuris, scutello saepe, postscutello et propodeo rubro-notatis; abdominis segmento primo fere toto rubro, secundi margine apicali lateribusque rubris. Caput supra antennas cum mesonoto nitidum, et grosse punctatum. Abdominis segmentum secundum convexum, vix elevatum. ♂ ♀. Long. 5—8 mm.

Black, the wings infuscate, with a blue or violaceous iridescence. The head in front, the tegulae, mesopleurae, the scutellum often, the postscutellum, and propodeum have red markings. The prothorax is black. Basal segment of the abdomen entirely or almost entirely, the apical margin of the second segment, and its sides, red. Head and thorax shining, coarsely punctured. Basal segment of the abdomen with close shallow punctures; second segment rather strongly convex longitudinally; beneath, at the sides, raised from the apices of the costae, the depression which is moderately wide meeting them obliquely.

HAB. Lanai, on the coast. Haleakala, Maui (4000 ft. or more). Not a rare species. Referred by Dalla Torre in his catalogue to *O. sandwichensis*, but probably distinct.

(51) *Odynerus potamophilus*, sp. nov.

Niger, fronte, pronoto, mesopleuris, tegulis, scutello, postscutello, et propodeo rubro-notatis. Abdominis segmentum primum fere totum rubrum; secundum margine apicali lateribusque suis rubris. Caput supra antennas cum mesonoto nitidum et fortiter punctatum. Abdominis segmentum secundum vix elevatum; subtus, depressione costarum apicibus oblique occurrente. ♀. Long. 7—8·5 mm.

Very closely allied to the preceding but readily distinguished by the red markings of the prothorax. The mesothorax in front is rather less coarsely punctured, the punctures are deeper and more distinct, being more distant. The structure of the second ventral segment of the abdomen is very similar in the two species.

HAB. Haleakala, Maui (4000—5000 ft.). Rare. 3 ♀.

(52) *Odynerus petrobius*, sp. nov.

Niger, subnitidus, alis infuscatis, caeruleo-iridescentibus. Fronte, mesopleuris, tegulis, nonnunquam scutello, postscutello, et propodeo, rubro-notatis. Segmentum abdominis primum late rubrum; secundum lateribus nonnunquam rubro-maculatis. Caput cum mesonoto grosse denseque punctatum. Segmentum abdominis secundum vix elevatum; subtus, depressione lata. ♂ ♀. Long. 5—8 mm.

Black, the wings with blue iridescence. The front of the head, the tegulae, mesopleurae, sometimes the scutellum, the postscutellum, the propodeum at the sides, the basal segment of the abdomen over a large part of its surface, and sometimes the sides of the second, have red markings. The prothorax and apical margin of the second abdominal segment are black. Clypeus truncate or very slightly emarginate at the apex; head coarsely and very closely punctured, especially in the ♂. Mesothorax with close and large puncturation, less regular posteriorly in the ♀; scutellum punctured, generally more finely in the ♀ than in the ♂. Propodeum with shallow, large punctures. Basal segment of the abdomen with coarse punctures, especially towards the base; second segment convex, hardly raised; beneath with the depression wide and rather deep, the segment at the sides being raised from the apices of the costae to a height equal to, or rather greater than, that of its basal portion.

HAB. Molokai coast, and in the mountains as high as 3000 ft.

(53) *Odynerus rubropustulatus.*

Odynerus rubropustulatus, Blackburn, P. Manch. Soc. Vol. xxv., Session 1885—1886, p. 159.

Niger, rubro-notatus, alis infuscatis caeruleo-iridescentibus, praecedenti simillimus, mesonoto minus dense punctato, thorace toto cum propodeo nigro bene distinguendus. ♂ ♀. Long. 6—8 mm.

Very closely allied to the preceding, the wings with a similar bright blue iridescence. The thorax is rather less shining between the punctures, which are less strong; and the propodeum as well as the rest of the thorax is entirely black, without red markings. The depression beyond the costae of the second ventral segment is also of a somewhat different character, and less deep.

HAB. Mountains of Hawaii (4000 ft.), Kona and Kau districts.

(54) *Odynerus blackburni.*

Odynerus blackburni, Kirby, Ent. Month. Mag. XVII. p. 87. Blackburn, P. Manch. Soc. Vol. XXV. No. 8, Session 1885—1886, p. 156.

Odynerus rubritinctus, Smith ♂ nec ♀. J. Linn. Soc. Vol. XIV. p. 674.

Niger, alis fuscis, subaeneo- vel violaceo-micantibus, fronte, tegulis, mesopleuris, scutello plus minusve, postscutello, et propodeo rubro-notatis. Abdominis segmentum primum ex majore parte rubrum; secundum maculis lateralibus rubris. Coxis femoribusque saepe plus minusve rufis. ♂ ♀. Long. 6—9 mm.

Form and sculpture much as in the two preceding species, with which it agrees also in having the prothorax and apical margin of the second abdominal segment black. The scutellum is always spotted with red, sometimes almost entirely of that colour, and the second segment of the abdomen has large lateral red spots. The propodeum is largely red. The head, thorax, and basal segment of the abdomen are covered with large and close punctures; the second segment longitudinally convex, but not evidently raised from the base. The wings are dark with somewhat of a brassy glitter, and in some specimens with more or less violaceous iridescence, but not blue.

HAB. Kauai coast and lower slopes of the mountains. Abundant.

(55) *Odynerus soror*, sp. nov.

O. blackburni simillimus, sed pronoto anguste rufo-lineato, mesonoto magis nitido, postice magis profunde punctato, abdominis segmento secundo fortius convexo distinguendus. ♀. Long. 8 mm.

Very like *O. blackburni*, the wings of the same colour, without any bright blue iridescence. The prothorax in front has a narrow red line on each side, the whole thorax is more shining, the puncturation of the mesothorax is deeper and clearer posteriorly; the second segment of the abdomen is rather more strongly convex longitudinally, and beneath, its depression is rather deeper.

HAB. Mountains of Kauai in the forest (3000 ft.); 2 ♀ taken.

(56) *Odynerus frater*, D. T.

Odynerus frater, Dalla Torre, Cat. Hym. Fam. Vespidae.
Odynerus pacificus, Blackburn, P. Manch. Soc. Vol. XXV. (1885—1886), p. 159; (nec Kirsch).

Niger, opacus, alis obscure caeruleo-iridescentibus, abdominis segmento primo et secundo totis, vel fere totis, rufis. Clypeus emarginatus. Caput cum mesonoto peropacum, subobsolete punctatum. Abdominis segmentum secundum haud quaquam elevatum; subtus, depressione lata. Thorax cum propodeo totus niger, tegulis nonnunquam rufis. ♂ ♀. Long. 5·5—8 mm.

Black, the wings infuscate and with slight blue iridescence. Two basal segments of the abdomen nearly entirely red. Clypeus distinctly emarginate, head and thorax with the surface very dull, and the punctures feebly impressed, more nearly obsolete in some examples than in others. Abdomen with the basal segment dull, closely, but very shallowly, punctured; second slightly shining, simply convex longitudinally; beneath, with the depression well-defined, meeting the apices of the costae widely at its base.

Hab. Hawaii, on the coast. Molokai and Maui coast, and lower slopes of the mountains. On the latter two islands this species has the tegulae red; those from Hawaii have these parts black.

(57) *Odynerus obscure-punctatus.*

Odynerus obscure-punctatus, Blackburn, l. c. p. 160.

Niger, alis infuscatis, laete caeruleo-iridescentibus, thorace cum propodeo nigro, abdominis segmentis 2 basalibus maculis rubris lateralibus ornatis. Caput supra antennas subobsolete punctatum. Mesonotum peropacum, plus minusve obscure et subobsolete punctatum, propodei puncturatione fere obsoleta. Abdominis segmentum primum aequaliter punctatum, segmenti 2 ventralis depressione lata, costarum apicibus late occurrente. Long. ♂ 6—8, ♀ 8—9 mm. (Plate I. fig. 13.)

Black, wings infuscate, and with bright blue iridescence. Mandibles more or less red. Thorax and propodeum without red markings. Two basal segments of the abdomen with red lateral spots. Clypeus very slightly emarginate or truncate; head above the antennae with very feebly impressed puncturation. Thorax very dull, with very shallow more or less obsolete punctures. Propodeum with indications of large, shallow puncturation. Abdomen shining, basal segment evenly punctured;

second more finely so, somewhat strongly convex at the base in the ♂, less strongly in the ♀; beneath with a well-marked deep depression, meeting the apices of the costae widely at its base.

HAB. Kona district of Hawaii, on the coast, and in the mountains up to an elevation of 3000 ft. or more. Oahu? Beechey expedition. In the British Museum.

(58) *Odynerus dyserythrias*, sp. nov.

Niger, alis infuscatis, caeruleo-iridescentibus, abdominis segmento secundo subtus rubro, nonnunquam lateribus ejus rubro-maculatis; mandibulis rufis. Clypeus distincte dentato-emarginatus. Caput supra antennas confertissime, mesonotum dense fortiterque punctatum. Propodeum rugosum. Abdominis segmentum 2 ventrale depressione angustula, minus alta. ♂. Long. 8 mm.

Male black, the abdomen entirely black above, or with a red spot at the sides of the second segment, which beneath is nearly entirely red. Mandibles red, the clypeus distinctly dentately-emarginate; head above the antennae very densely punctured; mesothorax deeply and closely (more densely in some examples than in others), the interstices between these punctures somewhat shining and minutely punctured; scutellum very distinctly punctured, but more finely than the mesothorax; propodeum rugose. Abdomen with the basal segment closely and evenly punctured; second segment beneath raised at the sides above the apices of the costae to about the height of its basal portion, the depression feeble, with a more deeply impressed median line.

HAB. Kilauea, Hawaii (4000 ft.). Eight or nine ♂ taken, but no ♀.

(59) *Odynerus cyanopteryx*, sp. nov.

Niger, alis infuscatis, caeruleo-iridescentibus, mandibulis cum apice clypei rufis, abdominis segmenti secundi lateribus rubro-maculatis. Mesonotum opacum, subtilius, sat distincte punctatum. Abdominis segmentum secundum juxta basim subelevatum; subtus, costis brevissimis, depressione levissima et angustissima. ♂ ♀. Long. 7—9 mm. (Plate I. fig. 28 and 28*a*.)

Black, the wings with bright blue iridescence, the thorax entirely black, as also the basal segment of the abdomen. Mandibles and apex of clypeus red. Second segment of the abdomen with a red spot at the sides in front, and more or less red on its ventral surface. In one example these markings are very obscure, but they can be seen in a favourable light. Apex of clypeus very slightly dentately-emarginate; the head above the antennae dull, and shallowly punctured. Mesonotum not coarsely, but quite distinctly punctured, the surface dull. Abdomen with the surface shining, the basal segment depressed along its apical margin, with shallow puncturation; second segment evidently raised from its base, especially in the ♂; beneath with the costae very short, the depression narrow and very light, sometimes hardly evident.

HAB. Kona and Kau districts of Hawaii (4000 ft.).

(60) *Odynerus egens*, sp. nov.

Niger, alis infuscatis, caeruleo-iridescentibus, mandibulis et apice clypei rubris, abdomine toto nigro. Caput cum mesonoto peropacum, vix evidenter punctatum. Abdominis segmentum 2 ventrale costis fortibus et brevissimis, post has subplanum, depressione nulla. Long. ♂ 8 mm.

Black, the wings with blue iridescence, the apex of the clypeus and the mandibles red. Thorax and abdomen black. On the second ventral segment of the latter a faint reddish tint can be seen in a strong light. Head and thorax with the surface finely roughened, dull, the puncturation almost obsolete. With a very strong lens both systems of the thoracic punctures can be seen to be present, but very feebly impressed; the minute ones are rather less nearly obsolete, and form the chief part of the puncturation. The mesothorax in front has a smooth median line, extending back about one-third of its whole length. The second segment of the abdomen is very little raised from the base; beneath, the costae are short but strong, not so long as the basal part of the segment, which is shining; beyond the costae there is no evident depression, but the surface is nearly flat.

HAB. Kona, Hawaii (4000 ft.), Aug. 19, 1892, 1 ♂.

(61) *Odynerus nesiotes*, sp. nov.

Niger, alis infuscatis, caeruleo-iridescentibus, abdominis segmentorum 2 basalium marginibus postice albo-marginatis. Mesonotum subnitidum grosse, fortiter, denseque punctatum. Abdominis segmentum 2 ventrale sulco nitido, costis fere obsoletis, depressione lineari, minus distincta. ♂♀. Long. 7·5—9 mm.

Black, the wings with blue iridescence. Basal segment of the abdomen with a narrow, and the second with a wide, cream-coloured apical band. Head above the antennae, and the mesothorax, very densely, coarsely and rugosely punctured, the surface between the punctures shining. Propodeum with evident but shallow puncturation. Abdomen with the basal segment densely punctured; second segment beneath, with the sulcature for the most part smooth, with only traces of the costae at its base, the depression represented by a faintly impressed line.

HAB. Mountains of Kauai, near Makaweli (2000—3000 ft.).

(62) *Odynerus dubiosus.*

Odynerus dubiosus, Smith, Proc. Linn. Soc. XIV. p. 681. Blackburn and Cameron, l. c. p. 155.

Niger, alis fuscis, haud caeruleo-iridescentibus. Mesonotum vix nitidum, ♂ subgrosse, ♀ subtilius punctatum. Abdominis segmentum primum juxta basim grosse punctatum; secundum longitudinaliter convexum, vix elevatum; subtus, depressione distincta, sat lata. ♂♀. Long. 6—8 mm.

Black, the wings shining fuscous, without blue iridescence. Apex of clypeus depressed, hardly emarginate, head above the antennae with close and very shallow punctures. Mesothorax with the surface very slightly shining, somewhat coarsely punctured, but not deeply. Propodeum with very shallow punctures, giving it a more or less rugose appearance. Basal segment of the abdomen coarsely punctured at the base, the punctures becoming finer towards the apex; second segment hardly raised from the base, but longitudinally convex; beneath, with a very distinct depression, which is wide in front.

HAB. Honolulu, Waianae, &c., Oahu; on the plains. Very abundant round walls built of lava, in the holes of which it forms its cells.

(63) *Odynerus threnodes*, sp. nov.

Niger, opacus, alis fuscis, subaeneo-micantibus. Clypeus vix emarginatus. Mesonotum opacum, crebre, aequaliter, nec grosse, punctatum. Abdominis segmentum secundum minus elevatum; subtus, depressione lata, sat alta, costis oblique occurrente. ♀. Long. 6·5—8 mm.

Female black, with the wings shining fuscous and with a slight bronzy tint in certain aspects. Mandibles black, reddish at the tips; clypeus depressed at the apex, hardly emarginate; head above the antennae dull, with close but shallow punctures. Mesothorax dull, for the most part evenly and rather finely punctured; propodeum with the surface finely rugulose, the puncturation nearly obsolete. Basal segment of the abdomen in dorsal view about as long as wide, closely and shallowly punctured, the punctures coarser than those of the mesothorax; second segment scarcely raised from the base, hardly more than ordinarily convex; its sides beneath rather strongly raised from the apices of the costae, attaining a height evidently greater than that of the basal portion of the segment, the depression somewhat wide and deep, meeting the apices of the costae obliquely.

HAB. Waianae Mountains, Oahu (2000 ft. or more). 2 ♀.

This species is very closely allied to the preceding, but may be distinguished by the more shining mandibles, the duller surface of the mesothorax, which is more finely and rather more deeply punctured, and by the deeper depression of the second ventral segment of the abdomen.

(64) *Odynerus pterophaennes*, sp. nov.

Niger, nitidus, alis fuscis, micantibus, clypei apice truncato. Mesonotum nitidum sparsim irregulariter punctatum; propodeum laeve, haud dense punctatum. Abdominis segmentum secundum subfortiter elevatum, nitidum, puncturatione fere obsoleta; subtus, depressione minus lata. ♀. Long. 7·5 mm.

Female black, shining; wings fuscous, darker along the costal margin. Clypeus truncate at the apex, head above the antennae smooth and shining, with shallow punctures. Mesothorax shining, with fine sparse and irregular puncturation, propodeum smooth, but less shining than the rest of the thorax, with evident, but shallow, punctures. Abdomen shining, nearly vertical in front, coarsely punctured at the base, the punctures decreasing in size towards the apex; second segment rather abruptly raised from the base, with very fine indistinct punctures, even to the apical margin; beneath, with the depression narrow and not deep.

Hab. Oahu, a single ♀ taken in March, 1893, on the coast at Waialua, and a second in the Waianae Mountains (2000 ft.) in February, 1896.

(65) *Odynerus iopteryx*, sp. nov.

Niger, alis infuscatis, caeruleo-iridescentibus. Clypeus apice truncato; mesonotum subnitidum, sparsim subtiliter punctatum; propodeum opacum et rugosum. Abdominis segmentum primum juxta basim grosse, secundum vel ad apicem vix punctatum. ♀. Long. 7 mm.

Female black, the wings infuscate and with blue iridescence. Clypeus truncate at the apex; head above the antennae shining, with close and very shallow punctures. Mesothorax not very shining, finely and sparsely punctured, and with a distinct, but extremely fine, interstitial puncturation; scutellum with a few very feeble fine punctures; propodeum dull and rugose. Basal segment of the abdomen with very coarse shallow punctures at the base, less coarse towards the apex; second segment very strongly convex longitudinally from the base, its surface shining and without a definite puncturation, although in certain aspects traces of nearly obsolete punctures can be discerned; beneath, at the sides, it is raised from the apices of the costae to about the height of its basal portion, the depression shallow.

Hab. A single ♀ taken in the Waianae Mountains, Oahu, in April, 1892, at an elevation of over 2000 ft.

(66) *Odynerus waianaeanus*, sp. nov.

Niger, alis nitide fuscis, haud caeruleo-iridescentibus, abdominis segmento primo postice flavo-marginato. Clypeus leviter dentato-emarginatus. Mesonotum minus nitidum, subfortiter punctatum. Abdominis segmentum 2 ventrale depressione angustissima, haud alta. ♂. Long. 7 mm.

Male black, the wings fuscous, iridescent, but not blue; basal segment of the abdomen narrowly pale along its posterior margin. Clypeus slightly dentately-emarginate at the apex, head above the antennae closely punctured. Mesothorax slightly shining, somewhat coarsely and closely punctured. Propodeum with the surface somewhat smooth and bearing some large and very shallow punctures. Basal segment of the abdomen as long as wide in dorsal aspect, depressed along the apical margin, with shallow irregular punctures. Second evidently raised from the base; beneath with the depression very shallow and narrow.

Hab. Waianae, Oahu, on the coast. 1 ♂ taken.

(67) *Odynerus flosculus*, sp. nov.

Praecedenti simillimus, abdominis segmentis duobus basalibus postice albo-marginatis. ♂. Long. 7 mm.

Very like the preceding, of which it may possibly be a variety. It differs in having a rather wide yellowish-white apical band on the second segment of the abdomen, which is continued on the ventral surface. The mesothorax posteriorly is rather more rugosely punctate, and the depression of the second ventral segment is more definite, with a well-marked impressed median line.

Hab. Waianae, Oahu, on the coast; 1 ♂ taken.

(68) *Odynerus cooki*, sp. nov.

Niger, alis fuscis, nitentibus, iridescentibus, haud caeruleis; abdominis segmentis duobus basalibus postice flavo-marginatis. Mesonotum opacum, subtilius punctatum. Abdominis segmentum secundum longitudinaliter convexum; subtus, costis validis, depressione nulla. ♂. Long. 5—6 mm.

Male black, the wings shining, fuscous, iridescent, but not blue. Apical margin of each of the two basal abdominal segments narrowly yellowish-white. A minute median spot behind the insertion of the antennae, and one behind each eye of the same colour. Clypeus slightly dentately-emarginate. Head above the antennae with

obscure, ill-defined punctures. Mesothorax dull, somewhat finely and not closely punctured, the punctures shallow. Propodeum dull, with the posterior concavity rugose. Basal segment of the abdomen transverse in dorsal aspect, with shallow punctures; second simply convex longitudinally above; beneath with the costae strong, followed by a smooth space in the part usually occupied by a depression, which in this species is wanting, the segment being nearly flat beyond the costae and not elevated even at the sides.

HAB. Kealakeakua bay, Hawaii; ♂ only taken, close to the monument erected to Captain Cook.

(69) *Odynerus acœlogaster*, sp. nov.

Niger, alis infuscatis, subcaeruleo-iridescentibus, clypeo, fronte, tegulis, postscutello, tibiisque flavo-notatis, abdominis segmentis duobus basalibus postice flavo-marginatis. Clypeus apice truncato. Mesonotum vix nitidum, distincte, sed postice minus aequaliter, punctatum. Abdominis segmentum 2 ventrale costis parte sua basali brevioribus, post has subplanum, depressione obsoleta. ♂. Long. 7·5 mm.

Male black, the clypeus, a median spot behind the antennae, one on the tegulae, the postscutellum, the tibiae more or less above, and the hind margin of the two basal abdominal segments, pale yellow. Wings infuscate and with a blue iridescence. Apex of clypeus truncate. Mesothorax slightly shining, distinctly and rather finely punctured, more sparsely posteriorly than in front. Propodeum dull, somewhat finely rugose. Basal segment of the abdomen with shallow punctures; second somewhat raised from the base; beneath, with the costae short, shorter than the basal portion of the segment, which is tumid; beyond the costae the segment is nearly flat, and without any definite depression.

HAB. Waianae, near sea-level; 1 ♂ taken. The markings would probably vary in a series, but the species is very distinct structurally.

(70) *Odynerus vittativentris*, sp. nov.

Niger, alis infuscatis caeruleo-iridescentibus, abdominis segmentis duobus basalibus postice albo-marginatis. Mesonotum dense distincteque nec grosse punctatum. Propodeum sublaeve, vix evidenter punctatum. Abdominis segmentum 2 ventrale costis brevissimis, sat fortibus, parte sua basali tumida, post costas depressione nulla. ♂♀. Long. 8—10 mm. (Plate I. fig. 29 and 29*a*.)

Black, the wings infuscate, and with blue iridescence, the two basal segments of the abdomen with yellowish-white apical bands, that on the second the wider. Clypeus slightly dentately-emarginate in the ♂, truncate or nearly so in the ♀.

Mesothorax dull in the ♂, generally somewhat shining in the ♀, distinctly and closely, but not coarsely, punctured. Propodeum somewhat smooth, with very obscure traces of puncturation. Basal segment of the abdomen finely and not very closely punctured; second hardly raised from the base; beneath, with the costae very short, although rather strong, much shorter than the tumid and strongly developed basal portion of the segment, beyond the costae somewhat flat, and with no evident depression.

Hab. Mountains of Kauai; not rare.

(71) *Odynerus cephalostictus*, sp. nov.

Niger, alis infuscatis, caeruleo-iridescentibus, fronte flavo-notata, abdominis segmento primo rufescente, secundi lateribus rufo-maculatis. Clypeus fortiter emarginatus. Mesonotum minus nitidum, inaequaliter subtiliterque punctatum. Propodeum opacum subobsolete rugoso-punctatum. Abdominis segmentum 2 ventrale depressione levissima, male definita. ♀. Long. 9—9·5 mm.

Female black, with a small median flavous spot behind the antennae, the basal segment of the abdomen mostly red, the second red at the sides near the base. Wings infuscate and with blue iridescence. Apex of clypeus deeply emarginate; head above the antennae not very densely punctured. Mesothorax somewhat shining, with fine shallow and irregular puncturation; between these punctures the surface is very densely and minutely punctured. Propodeum dull, with rugose and almost obsolete puncturation. Basal segment of the abdomen vertical in front, and shallowly punctured; second slightly raised from the base; beneath, with the depression very shallow and more or less vague, the segment even at the sides hardly raised from the apices of the costae.

Hab. Mountains of Molokai; rare, 3 ♀ taken between June and September, 1893, at an elevation of 3000 ft.

(72) *Odynerus axestes*, sp. nov.

Niger, fronte flavo-notata, mandibulis plus minusve rufis, abdominis segmento primo et secundo lateribus obscure rufescentibus, alis infuscatis, caeruleo-iridescentibus. Clypeus fortiter emarginatus. Mesonotum peropacum, inaequaliter leviter punctatum, propodei concavitate rugosa. Abdominis segmentum secundum longitudinaliter convexum, subtus depressione levissima. ♂. Long. 9 mm.

Black, with a median flavous spot behind the antennae, the mandibles more or less red, and the two basal segments of the abdomen obscurely reddish at the sides, the second for the most part red also beneath. Wings infuscate, with a blue iridescence. Clypeus deeply emarginate, the head above the antennae dull, and with very shallow punctures. Mesothorax with the surface very dull, the puncturation irregular, very feebly impressed, and somewhat fine, the interstices with minute puncturation which is also very feebly impressed. Propodeum dull, the surface finely roughened, the concavity somewhat rugose. Abdomen with the second segment longitudinally convex, not otherwise raised from the base; beneath, with the depression evident, but very shallow.

HAB. Kona district, Hawaii, 4000 ft. Rare, 2 ♂ taken; June and September, 1892. Closely allied to the preceding but easily known by the very dull mesothorax, the less raised (or tuberculate) second dorsal segment of the abdomen, &c.

(73) *Odynerus insulicola.*

Odynerus insulicola, Blackburn, P. Manch. Soc. Vol. xxv. (1885–86), p. 163.
Odynerus nautarum, Dalla Torre, Cat. Hym. Fam. Vesp., nec de Saussure.

Niger; haud nitidus, alis infuscatis, plus minusve caeruleo-iridescentibus. ♂ clypeo, antennarum articulo basali, tegulis, postscutello, nonnunquam pronoto, tibiisque, flavo-notatis; abdominis segmentis 2 basalibus postice flavo-marginatis. Colore variabilis, sed clypeo semper plus minusve flavo-notato; ♀ nigra, abdominis segmento primo nonnunquam postice pallido-marginato. Clypeus fortius emarginatus. Frons capitis remote, mesonotum inaequaliter, subtiliter punctatum. Abdominis segmentum secundum haud elevatum; subtus, depressione distincta, minus alta. ♂ ♀. Long. 7—9 mm.

Male with the clypeus almost entirely, or only a small spot on it, yellow. The scape of the antennae, the tegulae, the apical margins of the first two abdominal segments, the tibiae, and sometimes the prothorax and postscutellum have yellow markings. Excepting that the clypeus has always (as it appears) at least a yellow spot, all these markings may be wanting, and some of them at least, generally are. Female black, with a minute spot behind the eyes, and sometimes the apical margin of the basal segment of the abdomen pale.

Clypeus distinctly, and usually somewhat angulately emarginate in both sexes; head above the antennae finely and remotely punctured. Mesothorax dull, finely and irregularly punctured, the puncturation finer in the ♀ than in the ♂. Propodeum subobsoletely and somewhat rugosely punctured. Basal segment of the abdomen with shallow, more or less even punctures; second not raised from the base, covered in fresh examples with fine sericeous pubescence; beneath with the depression rather wide, but shallow, meeting the apices of the costae obliquely.

HAB. Molokai, Lanai, and Maui, on the coast, and in open country up to an elevation of 3000 ft., but not in the forest. Dalla Torre in his catalogue refers this species to *O. nautarum*, Sauss., but that species has 'le métathorax seul ponctué.'

(74) *Odynerus nesotrephes*, sp. nov.

Niger, alis infuscatis, subcaeruleo-iridescentibus, tegulis cum postscutello flavo-notatis, abdominis duobus segmentis basalibus postice flavo-marginatis. Clypeus distincte emarginatus. Mesonotum opacum, subtiliter et inaequaliter punctatum, interstitiis densissime et minutissime ruguloso-punctatis. Propodeum subobsolete punctatum, concavitate rugosa. Abdominis segmentum 2 ventrale depressione lata, minus alta. ♀. Long. 8 mm.

Female black, with the tegulae and postscutellum spotted with yellow, and the hind margin of the two basal abdominal segments of the same colour. Wings infuscate with very little blue iridescence. Clypeus distinctly emarginate, head above the antennae dull with somewhat remote and fine puncturation. Mesothorax dull, finely and irregularly punctured, more sparsely behind than on the anterior part. Propodeum with some large shallow punctures in front, the concavity rugose. Abdomen dull, covered with sericeous pubescence, the second segment not raised, ordinarily convex longitudinally; beneath with a well-marked, wide, but shallow depression, costae longer than the basal part of the segment, strong, but not very closely set.

Hab. Waialua, Oahu, a single example on the coast.

(75) *Odynerus lanaiensis*, sp. nov.

Niger, alis plus minusve infuscatis et caeruleo-iridescentibus. Clypeus vix emarginatus. Mesonotum dense fortiter punctatum. Propodeum opacum rugoso-punctatum. Abdominis segmentum secundum vix elevatum; subtus, depressione distincta nulla. ♂♀. Long. 6·5—10 mm.

Black, the wings infuscate, but not deeply, except along the costal margin of the anterior pair, their iridescence blue.

Apex of the clypeus hardly emarginate, head above the antennae densely punctured. Mesothorax strongly and closely punctured, the punctures rather larger in the ♂, and the surface of the thorax more dull. Propodeum rugose. Basal segment of the abdomen somewhat evenly punctured; second slightly raised from the base; beneath, somewhat flat beyond the costae, with no depression, or at the most with only a vague indication of one.

Hab. Lanai, on the coast at Manele.

(76) *Odynerus pterocheiloides*, sp. nov.

Niger, alis infuscatis, caeruleo-iridescentibus, fronte ♂ flavo-notata, mandibulis rufis. Caput cum mesonoto ♂ opacum, ♀ vix nitidum; mesonotum ♂ minus dense, ♀ sparsim subtiliter punctatum. Propodeum puncturatione fere obsoleta subrugosum. Abdominis segmentum secundum haud elevatum, subtus depressione fere obsoleta. ♀ palpi labiales pilis longis utrinque ciliati. Long. ♂ 5—7·5, ♀ 9 mm.

Black, the wings infuscate, and with blue iridescence, the ♂ with a median flavous spot behind the antennae.

Head and mesothorax dull in the ♂, and hardly shining in the ♀. Mesothorax finely, feebly, and sparsely punctured in the ♀, rather more largely and closely in the ♂, but very shallowly. Minute puncturation between these punctures distinct. Propodeum somewhat rugose, with nearly obsolete punctures. Abdomen with the second segment convex but not raised from the base; beneath, with the depression nearly obsolete. Labial palpi of the ♀ extremely long, and beautifully ciliated with long hairs. Mandibles more or less red or reddish.

Hab. Kona district of Hawaii (4000 ft.). Hawaii (loc. ?), Blackburn. Mr Blackburn has sent over a ♀ of this species, as representing his *O. hawaiiensis*, but it does not at all agree with his description of that species.

(77) *Odynerus congruus*.

Odynerus congruus, Smith, J. Linn. Soc. xiv. p. 680. Blackburn and Cameron, P. Manch. Soc. xxv. p. 155.

Praecedenti forma et magnitudine similis, capite et mesonoto magis nitidis et laevioribus distinguendus. ♂♀. Long. 6—10 mm. (Plate I. fig. 30.)

Very closely allied to the preceding, but easily distinguished by the more shining surface of the front of the head and the mesothorax. In the ♀ the second ventral segment has no depression beyond the costae, and behind the antennae there is a median flavous spot as in the ♂.

Hab. Molokai, Lanai, and Maui, on the coast, and in the mountains, up to an elevation of 3000 ft., but not in the forest. This and the closely allied preceding species are, as far as the ♀ is concerned, very different to any other Hawaiian species. The type of the ♂ has four yellow spots on the clypeus, which is abnormal, the clypeus usually being entirely black. It is remarkable that the extraordinary appearance of the palpi has been passed over unnoticed. The locality 'Honolulu' is given in Lit. and Phil. Soc. Manch. Vol. xxv. (1885–86), p. 155, but this is no doubt an error, as in Ent. Mo. Mag. Vol. xvii. p. 87, the species is said to have been taken with *Prosopis blackburni*, an insect peculiar to Maui, and I have myself taken them together on that island.

(78) *Odynerus chelifer*, sp. nov.

Niger, alis infuscatis caeruleo-iridescentibus, mandibulis plus minusve rufescentibus vel piceis. Mesonotum opacum, distincte subtilius punctatum. Abdominis segmentum secundum haud elevatum; subtus, depressione fere obsoleta. Uterque sexus genis inter oculos mandibulasque distinctis (♀-ae longioribus) insignis. Mandibulae (♀) perlongae et angustae, dentibus fere obsoletis. ♂♀. Long. 5—7 mm. (Plate I. fig. 31.)

Black, the wings infuscate, and with blue iridescence. Mandibles more or less red or piceous on their apical portion. The cheeks between the base of the mandibles and eyes are distinct in both sexes, but longer in the ♀, in which sex the mandibles are extremely long and narrow, with the teeth obsolete or nearly so. The length of the part of the mandible, which projects beyond the apex of the clypeus, is about equal to the length of the clypeus itself. Interantennal carina very distinct and sharp, no flavous spot at its base. Mesothorax dull, distinctly but finely punctured; propodeum roughened by the subobsolete punctures. Abdomen with the second segment simple above, not raised from the base; beneath, with the depression extremely feeble and indefinite.

HAB. Kona, Hawaii (4000 ft.); Molokai and Lanai (coast to 3000 ft.). Rare. The examples from Hawaii do not altogether agree with the others, but the material is insufficient to separate them specifically.

(79) *Odynerus nigripennis.*

Rhygchium nigripennis, Holmgren, Eugenies Resa, Zool. VI. p. 441.

Odynerus maurus, Smith, J. Linn. Soc. XIV. p. 679.

Odynerus nigripennis, Blackburn and Cameron, P. Manch. Soc. Vol. XXV. (1885—86), p. 151.

Niger, robustus, alis infuscatis, caeruleo-iridescentibus, fronte flavo-notata. Clypeus leviter dentato-emarginatus. Mesonotum cum scutello densissime, subtilius, rugoso-punctatum. Postscutellum ad truncationem linea elevata (plerumque serrulata) munitum. Abdominis segmentum secundum haud elevatum; subtus, depressione lata, minus alta, costis subobsoletis. Long. ♂ 7—10·5 mm. ♀ 8—14 mm.

Black, the wings infuscate, and with a blue (but not bright) iridescence. A small median spot behind the antennae, and another behind each eye, often flavous. Apex of clypeus depressed, and lightly emarginate. Mesothorax finely, but very densely rugosely-punctate, the punctures generally rather larger in the ♂. Post-

scutellum with a very distinct raised line (usually serrulate or spinulose) at the truncation. Propodeum rough with large, feebly impressed, punctures. Abdomen with the second segment not raised from the base; beneath, with a wide depression, but shallow, meeting the apices of the costae obliquely, the costae themselves more or less obsolete or indistinct.

HAB. All over the islands from Oahu to Hawaii on the coast and as high as 4000 ft. in the mountains.

(80) *Odynerus radula.*

Odynerus radula, Fab. Ent. Syst. II. p. 269. Blackburn and Cameron, l.c. p. 150.

Odynerus localis, Smith, J. Linn. Soc. XIV. p. 678. (♂ nec ♀.)

Praecedenti cognatus, niger, robustus, alis infuscatis, caeruleo-iridescentibus, abdominis segmentis 2 basalibus postice flavo-marginatis. Mesonotum dense rugoso-punctatum; propodeum rugosum. Abdominis segmentum secundum haud elevatum; subtus, depressione latissima, oblique costis occurrente. Long. ♂ 6·5—11, ♀ 9—14 mm. (Plate I. fig. 14.)

Black, the wings infuscate and with blue iridescence, the apical margins of the two basal abdominal segments yellow. Of the same robust form as the preceding, and like that species with transverse basal segment of the abdomen, and a raised line at the truncation of the postscutellum. On the mesothorax two forms of puncturation can be made out in the ♂, consisting of larger and smaller punctures, the whole forming a dense and subrugose puncturation. In the ♀ the mesothoracic puncturation is almost identical with that of the preceding. The depression of the second ventral segment is wide and shallow, the costae are less obsolete than those of *O. nigripennis*.

HAB. Kauai, common on the coast and in the mountains, occupying the place which *O. nigripennis* holds on the other islands. It is evidently a directly modified form of that species.

(81) *Odynerus localis*, Smith.

Odynerus localis, Smith, J. Linn. Soc. XIV. p. 678. (♀ nec ♂.)

Niger, alis infuscatis, caeruleo-iridescentibus, abdominis segmentis 2 basalibus postice albo-marginatis. Mesonotum ♂ dense rugoso-punctatum, ♀ creberrime subtilius punctatum. Postscutellum linea elevata munitum. Abdominis segmentum primum subdepressum, parte anteriore dorsali parti subacute occurrente; secundum haud elevatum; subtus depressione minus lata. ♂♀. Long. 8—17 mm. (Plate I. fig. 15.)

Allied to the preceding species, but with the abdominal bands wider. The scutellum is more rugosely punctured, and the basal segment of the abdomen is differently formed, being somewhat depressed from the base to the apex, and where the anterior and dorsal surfaces meet a comparatively sharp edge is formed, instead of this part being evenly rounded off. The depression of the second ventral segment is much less wide at its base, occupying only about the middle third of the segment, and the middle costa of the series is conspicuously long. The abdomen is altogether more shining, as also the surface of the mesothorax of the ♀.

Hab. Mountains of Kauai. Not rare.

The following five species of the genus *Odynerus* were brought back by the Beechey expedition many years ago. Probably all were collected at or near Honolulu, and most if not all of them are in that case now extinct. Neither the Rev. T. Blackburn nor myself have met with any of these species. The descriptions of the first two are copied from de Saussure's Etud. Fam. Vesp. (Pt. III.). The types were originally in the British Museum, but apparently no longer exist. A single insect in that collection was assigned to *O. nautarum*, de Sauss. but does not agree with the description. Under the name *O. sandwichensis*, de Sauss. (or rather *sandwithii!*), were placed several insects of three quite distinct species, none of which could possibly have been the subject of de Saussure's description.

"Etud. d. Fam. Vesp. (Pt. III.). Mon. Masar. et Suppl. p. 289. Div. *Antodynerus*."

(82) "*O. nautarum*, n. sp."

"*Niger signaturis flavis: abdominis fasciis duabus flavis.*"

"Long. 9 mm.; env. 18 mm."

"Mâle. Formes allongées de l'*O. punctum*. Métathorax arrondi, lisse au milieu. Chaperon bituberculé au bout. Insecte noir, lisse; le métathorax seul ponctué. Chaperon, un point au haut des mandibules, devant du premier article des antennes, jaunes. Deux taches sur le prothorax, écaille, un tache sur l'aile, postécusson et une bande interrompue sur l'écusson, jaunes. Les deux premiers segments de l'abdomen ornés d'un large bordure jaune. Pattes noires; les tibias seuls, jaunes d'un côté; tarses noirs. Ailes hyalines, la côte enfumée, et le bout un peu violet.

Var. Ecailles, écusson, et antennes noires.

Habite: Les îles Sandwich. (Musée de Londres.)"

(83) "*O. sandwichensis*, n. sp."

"*Parvulus, niger, perdepressus; postscutello, metathorace, abdominis primo segmento, secundi margine et lateribus, rubris; alis caerulescentibus.*"

"Long. 7 mm.; env. 15 mm."

"Mâle. Petit, grêle, *très déprimé.* Métathorax dépassant de beaucoup le post-écusson, arrondi. Abdomen très plat; le premier segment en cloche, moins large que le deuxième. Insecte noir, ponctué, mais lisse et luisant. Entre les antennes un point rouge; un autre sous l'aile; deux autres sur chaque écaille; postécusson et métathorax d'un rouge sombre; le premier segment de l'abdomen, le bord du deuxième et ses côtés, de la même couleur, ainsi qu'un fin liseré le long des autres segments. Pattes noires. Ailes assez brunes, avec un reflet violet; deuxième cubitale subtriangulaire.

Distinct par sa forme très aplatie.

Habite. Les îles Sandwich. (Musée de Londres.)"

Obs. This species is evidently closely allied to *O. rubritinctus*, Sm.

The three following species are in the collection of the British Museum, and each is represented by only a single example. They appear to be distinct from any of the species collected by me.

(84) *Odynerus infaustus*, sp. nov.

Niger, mandibulis clypeique parte apicali rubris. Caput cum mesonoto obsolete punctatum. Abdominis segmentum secundum ventrale haud post costas depressum, parte basali permagna, costis multo longiore. ♀.

Black, mandibles and apical half of the clypeus red, the latter faintly emarginate at the apex. Head and whole thorax dull, the puncturation obsolete. Abdomen with the punctures of the basal segment very feebly impressed. Second ventral segment beneath with the basal portion very large, several times as long as the short costae, beyond which there is no depression. Wings dark, with violet iridescence.

Hab. Brought back by the Beechey expedition, probably from Oahu. The species appears to be very closely allied to *O. egens*, next to which it may be placed.

(85) *Odynerus oblitus*, sp. nov.

Niger, alis fuscis, abdominis segmentum basale postice testaceo-marginatum. Mesonotum opacum subtiliter sparsim punctatum, necnon etiam interstitiis subtilissime distincte punctulatis. Abdominis segmentum secundum ventrale post costas haud depressum, costis fortibus. ♂.

Black, the wings fuscous without blue iridescence, the apical margin of the basal segment of the abdomen testaceous, perhaps yellow in fresh examples. Clypeus faintly emarginate at the apex. Head dull, finely, feebly, and irregularly punctured. Mesothorax dull, very finely and sparsely punctured, and with a distinct and very minute puncturation between the larger punctures. Propodeum dull impunctate. Basal segment of the abdomen obsoletely punctured; second, beneath, with strong costae and beyond their apices flat, with no depression.

HAB. Brought back by the Beechey expedition, probably from Oahu. A single much mutilated ♂ example in the British Museum.

(86) *Odynerus relictus*, sp. nov.

Niger, capite cum thorace flavo-notato. Abdominis segmenta duo basalia postice flavo-marginata. Mesonotum opacum, sat evidenter, subirregulariter, punctatum. Abdominis segmentum primum leviter punctatum; secundum ventrale post costas haud depressum, costis distinctis, parte sua basali sat brevi. ♂.

Male black, the mandibles with a small yellow spot at the base. The clypeus, a small spot on the scape of the antennae, one behind their insertion, two on the prothorax, others on the tegulae, and the postscutellum, yellow, as well as the apical margin of the two basal abdominal segments. No doubt these yellow markings would be variable in a series of examples. Head dull, subobsoletely punctured; thorax dull, evidently, but somewhat irregularly, punctate, and with the system of interstitial minute puncturation distinct; scutellum irregularly punctured, the propodeum dull, with the surface somewhat roughened by large subobsolete punctures. Abdomen with the basal segment feebly punctured; second convex, distinctly punctured on its yellow apical margin; beneath, its basal portion is short, the costae are distinct, and there is no depression beyond them. All the tibiae have a yellow line above. The wings are infuscate, and have a slight blue iridescence.

HAB. Probably from Oahu (Beechey expedition). A single ♂ example in the British Museum under the name of *O. nautarum*, de Sauss. The description of that species says "le métathorax seul ponctué," which will not at all agree with the insect above described. This species might be placed near *O. insulicola*, Blk.

Two species described by the Rev. T. Blackburn, *O. hawaiiensis* and *O. haleakalae*, I have not been able to identify with any certainty, not having seen the original specimens. Mr Blackburn very kindly sent me an example under the former name, but it was quite clearly not the subject of his description. This example belongs to the species I have called *O. pterocheiloides*, and is excessively closely allied to *O. congruus*, Smith. There is no trace of tuberculation on the second segment of the abdomen, and this alone is sufficient to distinguish it from *O. hawaiiensis* as described, but it is certain from the remarks made at the end of the description of *O. hawaiiensis*, that several species were included under that name. As regards *O. haleakalae* I cannot refer it for certain to any particular one of the species found on Maui. There is no doubt, however, that both these species will prove referable to two of the species which I have described under new names. Possibly *O. hawaiiensis*, Blk. is the same as my *O. erythrognathus*, and *O. haleakalae*, Blk. as *O. ecostatus*.

ANTHOPHILA.

Obtusilingues.

Nesoprosopis, gen. nov.

Under this generic name I propose to separate certain bees which have hitherto been referred to the genus *Prosopis*, although at present it is necessary to rely on ♂ characters for the separation. In all the species examined (and these comprise most of the 52 species known to me) the 8th ventral segment is highly peculiar, and although exhibiting great variety in detail, yet always maintains the same general form. Its apex is always produced into an extremely long process, which on the ventral side rises erect or suberect from the body of the segment. In its simplest form the process is a delicate curved rod, expanded at the apex, or more usually bifurcated, the bifurcations being more or less recurved. On its apical portion at least it is clothed with long hairs. In many of the species the process is greatly expanded dorso-ventrally, so that in extreme cases it may be nearly as wide as long, and the apical bifurcations are also sometimes greatly expanded. All intermediate conditions between this and the simple form may be seen in the various species known from the islands.

The extreme apex of the process is always exposed in life, showing beyond the sixth segment, which is more or less compressed or carinate, and emarginate at the apex, the ventral surface of a part of the process resting within the carina. The seventh segment is entirely concealed, and in strong contrast with the eighth shows little specific modification. It is produced at the apex into two processes, one on either side, which are more or less bent downwards. These processes are longer in some species than others, and are not hairy as is the apical process of the eighth segment.

The genital armature itself is also remarkably similar, even in the most widely separated species. The stipites are thin, somewhat concave inwardly, and simple, there being no trace of a lacinia. On the apical portion they are always clothed with long hairs. The sagittae do not extend as far as the apex of the stipites, being strongly curved downwards a little before that point is reached, or in one or two species (owing to the length of the stipites) considerably before.

The sculpture of the various species is remarkable for its feebleness. The puncturation is always fine and shallow, and excepting a group of species, which are relatively of very great size, there is in no case any definite abdominal puncturation. This extraordinary similarity of sculpture adds greatly to the difficulty of differentiating the species. The anterior area of the propodeum is but ill-defined, and its posterior face always bears a longish erect pubescence.

The habits of the bees of this genus exhibit considerable variety. On the coast and dry mountain slopes they form their burrows in the ground, but in thick forests and wet districts their cells are made in dead wood, generally of standing trees. The larval food contains comparatively little pollen, as these bees have no special pollinigerous apparatus, and in cells that I have opened the larva was floating on the liquid food. Such pollen as is collected is swept towards the mouth by the curved hairs on the anterior tarsi, an dregurgitated with the honey. Some species are quite peculiar to the coast region, others to the forests, and a few to the region above the forest line. A few are found in dense and gloomy woods, which bees would hardly be expected to inhabit, and may be seen flying round some bush, where a little sunlight is able to penetrate.

In the following descriptions I have used the term 'anterior area' for that part of the propodeum called by Smith 'the enclosed space of the metathorax,' the 'basal area' of many other hymenopterists. In the Hawaiian species it is not enclosed, and should, I think, rather be called the apical than basal area. In any case the term used avoids any possible confusion. All the known species, where possible, have been redescribed, the old descriptions being insufficient for their determination.

The species of *Nesoprosopis* form several more or less definite groups. One of these is easily distinguished by the evidently punctate abdomen of both sexes, and the large, robust form, at least of the females. *N. fuscipennis* is typical of this group, to which also must be referred *N. andrenoides,* a most remarkable species, resembling at first sight a medium-sized or rather small *Andrena.* It differs from all the other large species in its nearly impunctate metallic abdomen, which bears fasciae of white pubescence. A second group is defined by its parasitic habits, and the clothing of the front tarsi of the ♀, the hairs of which have not the regular curved form of the industrial species. The females of all the parasitic species but one have the abdomen ferruginous at least at the base, but in two species the males are black or nearly so. Very closely allied to this group is another, the females of which are industrial, and provided with well-developed curved sweeping hairs on the front tarsi. The face is always long, and the pubescence of the front of the head is very short and inconspicuous. The remaining species form several ill-defined groups, none of which are parasitic, and in all the abdomen is impunctate or nearly so. The front of the head is clothed with more or less long hairs, at least in those which have the face elongate. Several species are distinguished by their small size, narrow form, and the more than usually long dorsal surface of the propodeum. *N. crabronoides* is the most striking species of this group. Others are remarkable for the great width of the face across the eyes, *e.g. N. laticeps* and its allies. Finally there are a number of species closely allied to *N. facilis*, which comprise the least remarkable species of the genus. The face is not extremely short and wide, nor is the form very narrow; the dorsal surface of the propodeum is short. These three last-mentioned groups, however, seem to be connected by intermediate forms.

The specific characters of the ♂ are chiefly to be found in the amount of dilatation of the scape of the antennae, the markings of the face (which, however, vary a good deal in some species), and the relative length and width of the head. The eighth ventral segment, which it is necessary to extract for examination, also furnishes very useful characters. If the scape of the antennae be viewed from the front, so that the front edge instead of the flattened surface be examined, it will be seen to be more or less concave beneath. The height and form of the arch so formed often furnishes useful specific distinctions. The females are much more difficult to separate, and in a few cases I see no specific distinction between two species, although the males are quite distinct. The shape of the head and its puncturation in front, the sculpture of the anterior area of the propodeum, the colour of the wings, and of the hairs on the apical segment of the abdomen, as well as the facial and prothoracic markings when present, furnish the most useful characters.

(1) *Nesoprosopis facilis.*

Prosopis facilis, Smith, J. Linn. Soc. XIV. p. 683.
Prosopis facilis, Blackburn and Cameron, P. Manch. Soc. Vol. XXV. (1885—86), p. 142. (Plate II. fig. 1, and fig. 8—8 *h*.)

Male black, with the clypeus, the plate above it, and an elongate spot on either side adjoining it, flavous; front tibiae and more or less of the front femora testaceous inwardly, intermediate and posterior legs black or nearly so. The sides of the face are widely and deeply depressed along the inner margins of the eyes; the antennae black with the scape dilated, about twice as long as wide, and strongly arched beneath; head above the antennae with the surface rough, shallowly punctured, clothed with rather long pubescence; mesothorax dull, with fine and shallow puncturation, that of the scutellum rather more distinct; wings more or less infuscate; propodeum longitudinally rugose to the brow, the rugosities more regular in some individuals than others; abdomen with the surface rugulose, with hardly definite or visible puncturation; beneath, with the sixth segment emarginate at the apex and carinated behind the emargination; process of the eighth sublinear, rising erect from the body of the segment and curved, bifurcate at its apex, very densely clothed with hairs on its apical half, the bifurcations with a long and regular fringe; genitalia with the stipites much produced at their apex, with long hairs on their outer margins, which do not extend to the extreme apex, being almost absent on the submembranous apical portion.

Female black, without any yellow markings on the face; head above the antennae pubescent as in the ♂, the antennae simple, and the face much wider between the eyes: mesothorax with very similar puncturation, but generally more clearly defined, as also is the anterior area of the propodeum, and more regularly longitudinally rugose; abdomen without definite puncturation, the terminal segments with dark pubescence above and beneath. Length, 6—9 mm.

HAB. Common generally on Oahu, Maui, Lanai, and Molokai, in dry or moderately dry localities, from the coast to an elevation of 4000 ft. in the mountains.

OBS. This is not a very variable species so far as the facial markings of the ♂ are concerned. The elongate spots adjoining the clypeus and that on the plate behind it are sometimes diminished in size or rarely absent. The latter part, although its sides are always longer than the apical margin, is variable, the length of the sides being considerably greater (in proportion to the length of the anterior margin), in some examples than in others. Those from Maui, Lanai and Molokai have this plate extremely long and narrow, but not more so than in some Oahuan specimens. The latter often have the wings clearer, and with a less distinct blue iridescence than those from the other islands, they are also on the average of smaller size, and the pubescence of the mesothorax is often paler in colour.

(2) *Nesoprosopis chlorosticta*, sp. nov.

Praecedenti colore ac puncturatione simillima, sed ♂ tibiis tarsisque posticis basi flavo-maculatis, capite latiore distinguendus. ♂ ♀. Long. 6—7·5 mm.

This species is very closely allied to the preceding, but the ♂ is easily distinguished by the yellow base of the posterior tibiae and tarsi, and apparently is not variable in this respect, as I have examined a fine series. It also has the face evidently wider across the eyes than *facilis*. The female is much more difficult to separate, but the face appears to be slightly wider, and the average size of the insect considerably less.

HAB. Mountains of Kauai (2000—4000 ft.). It is also found on the coast.

(3) *Nesoprosopis simplex*, sp. nov.

Praecedentibus simillima ; ♂ tibiis posticis haud flavo-notatis ; genitalium stipitibus minus productis, et usque ad apices longe ciliatis, distinctus. ♂ ♀. Long. 6—9 mm. (Plate II. fig. 9.)

In general appearance and puncturation very like the two preceding species ; the ♂ may be known at once from *N. chlorosticta* by the entirely dark posterior tibiae, and from either by the genital armature, the stipites of which are less produced, and fringed right up to the apex with long hairs. The plate above the clypeus is very variable in its proportions, the length of its lateral margin being sometimes longer, sometimes equal to, or even shorter than its anterior margin. I see no character to separate the ♀ from that of *facilis* ; the wings are strongly and entirely infuscate with evident blue iridescence, wherein they especially resemble examples of that insect, from Maui and Molokai, although their average size is less.

HAB. Island of Hawaii, generally distributed from 1500—4000 ft. elevation, and abundant.

(4) *Nesoprosopis hirsutula*, sp. nov.

Praecedentibus cognata, sed capite latissimo, latiore quam longiore ; ♂ tibiis basi longe flavescentibus, tarsis haud maculatis ; segmento ventrali 8° apice haud longe bifurcato, bene distinctus. ♂ ♀. Long. 6—9 mm. (Plate II. fig. 10—10 *c*.)

Male with the face very broad, transverse, the scape of the antennae slightly dilated, not quite so much as in *N. facilis*, &c., nor quite so strongly arched beneath : the clypeus, a small spot on either side of it, and the plate above it, pale yellowish-white. The latter two markings are variable, sometimes absent. The plate above the clypeus is very wide ; cheek between the eye and mandible extremely short ; clypeus clothed with rather long erect hairs, generally of an obscure colour ; head above the antennae with long, dark pubescence, and roughly punctured. Thorax with rather long obscure pubescence ; puncturation very like that of *facilis*, sometimes perhaps rather stronger ; posterior tibiae white at the base, but the tarsi dark ; eighth ventral segment of the abdomen with the process without long apical bifurcations.

Female very like the ♂, the face very wide with obscurely-coloured pubescence: cheek extremely short; the scutellum more or less shining; apical segments of the abdomen above and beneath with the hairs black or of an obscure colour.

HAB. Mountains of Kauai, 3000 ft., and on the high plateau.

(5) *Nesoprosopis difficilis*, sp. nov.

Nigra, mesonoto griseo-pubescente, subtiliter nec dense punctato, propodeo antice rugoso, alis plus minusve hyalinis, haud caeruleo-iridescentibus; ♂ articulo 1° antennarum dilatato, subtus fortiter arcuato, bis longiore quam latiore; capite prae antennis, necnon saepe tibiis tarsisque plus minusve flavescentibus; genitalium stipitibus apice rotundatis ac fimbriatis, haud productis; ♀ pedibus, segmentisque abdominis apicalibus pallide pubescentibus. ♂♀. Long. 5—8·5 mm. (Plate II. fig. 11—11 *c*.)

♂ Black, with the clypeus, the plate above it, and a spot on each side adjoining it, yellow; anterior tibiae pale in front; antennae with the flagellum often more or less pale beneath; the posterior legs often have the tibiae and basal joint of the tarsi more or less yellow, sometimes also the intermediate legs are similarly coloured. All these markings are variable, the posterior and intermediate legs are often entirely dark. The general appearance is that of *N. facilis*, &c., the head being of similar form and in typical specimens similarly marked.

Antennae with the scape dilated as in *N. facilis*, about twice as long as wide, and strongly arched beneath; plate above the clypeus generally short, the length of each of its sides to the antennal fossa subequal to or less than the length of its anterior margin; cheeks between the eye and base of the mandibles short; head above the antennae dull, with roughened surface, closely and shallowly punctured, clothed with long grey hairs. Mesothorax and scutellum clothed with somewhat long, erect, grey pubescence, puncturation much as in *N. facilis*, &c., the punctures fine and very shallow, but not very close, the fine rugosity of the surface and the pubescence generally giving them an indistinct appearance; anterior area of the propodeum longitudinally rugose, wings subhyaline, or quite clear in fresh examples. Abdomen as in *N. facilis*; genital armature with the stipites rounded at the apex, not at all produced, evenly fringed with long hairs; eighth ventral segment apparently rather variable, its process towards the apex clothed with hairs, but with a less dense covering than that of *N. facilis*, its apex not bifurcated into long branches, but usually only slightly dilated at the extremity, rarely with the angles of the dilatation more or less produced.

Female in general appearance very like that sex of *N. facilis*. Head above the antennae dull, with roughened surface, closely and shallowly punctured, clothed with long pubescence. Mesothorax very finely punctured; propodeum with the anterior area more or less regularly longitudinally rugose; wings hyaline or subhyaline without blue iridescence; abdomen without definite puncturation, calcaria testaceous; legs and the apical segments of the abdomen above and beneath with pale pubescence.

HAB. Molokai, Lanai, Maui and Hawaii; abundant in the mountains. This is a most perplexing species on account of its variability. In general appearance and sculpture it greatly resembles *N. facilis* and the allied forms. The yellow markings of the face in the ♂ are variable, being sometimes reduced in size, or altogether absent except that of the clypeus, which is always yellow over at least the greater part of its surface. Structurally the ♂ is quite distinct from the three species first described, by the simply rounded apex of the genital armature, which is not at all produced, and by the differences in the process of the 8th ventral segment. The female may be known by the clearer wings which are without blue iridescence and by the pale pubescence of the legs, and terminal segments of the abdomen. Sometimes the abdomen is of an immature reddish colour, as is also the case in other of the Hawaiian species which are normally black, the paler forms being apparently produced when the individuals arrive at maturity after an unusually short period has been occupied in the earlier stages.

(6) *Nesoprosopis laeta*, sp. nov.

Nigra, subnitida, praecedenti simillima, sed mesonoto et scutello subtilissime punctatis et laevioribus; metanoto minus rugoso; ♂ tuberculis pedibusque fere semper flavo-notatis; antennarum articulo primo fortiter arcuato; ♀ tuberculis saepe flavo-notatis, genis brevissimis. ♂♀. Long. 5—7 mm.

Closely allied to the preceding, the yellow markings variable. In the most brightly coloured males the following parts are yellow; the front tibiae in front and within, the intermediate tibiae inwardly, and the base and apex also outwardly; the posterior, except for a black spot towards the apex inwardly, and a more or less distinct fuscous stain outwardly; the basal joint of all the tarsi and sometimes also the apical ones, as well as the extreme apex of all the femora; the clypeus, the plate above it, an elongate spot on either side, and the tubercles of the prothorax are also yellow. In general the basal joint of all the tarsi, and the base of the posterior tibiae widely, are yellow. Of forty or fifty specimens of the ♂ one only has the legs entirely of an obscure colour, and this also has the tubercles black; while of about a score of the other sex, three or four have the tubercles black, and some of them have the posterior tibiae widely yellow at the base.

Male with the antennae formed much as in the preceding, the scape being strongly arched beneath, the lower surface of the flagellum pale; the plate above the clypeus as long to the antennal fossa, as the length of its apical margin, or rather longer; the cheeks between the mandible and eye very short. Mesothorax slightly shining, evenly clothed with pale hairs, very finely and shallowly punctured; the scutellum more shining, and also very finely punctured; propodeum finely longitudinally rugose in front. Abdomen without definite puncturation, the apex with pale hairs; process of the 8th ventral segment bifurcate at the apex.

Female generally with a spot on the tubercles of the prothorax, and sometimes the base of the tibiae and tarsi pale; wings subhyaline, cheeks very short as in the ♂; mesothorax slightly shining, and clothed with very short pale erect pubescence; scutellum smooth and shining, finely and sparsely punctured; propodeum finely longitudinally rugose in front; apex of the abdomen above and beneath with pale hairs.

HAB. Oahu both mountain ranges (2000—3000 ft.) and also on the coast at Waianae. Kauai, Makaweli (3000 ft.) and Halemanu (4000 ft.).

Examples taken on the coast of Molokai and Maui, which are of larger size, appear referable to this species, as also others (from the mountains of the former island), having the abdomen red. It is not improbable that both this species, and the preceding, as characterized above, in reality include several distinct forms.

(7) *Nesoprosopis kona.*

Prosopis kona, Blackburn, P. Manch. Soc. xxv. (1885—86), p. 144.

Female, black, with a narrow line bordering the eyes, two spots on the prothorax, the tubercles, a spot at the base of the anterior and intermediate tibiae, and the basal half of the posterior, yellow. Face somewhat long, the clypeus lightly emarginate at the apex, the head above the antennae clothed with long pale hairs, and shallowly punctured. Mesothorax and scutellum dull, with exceedingly minute and remote punctures. Anterior area of the propodeum with the longitudinal rugosities extremely short. Wings clear. Apical segment of the abdomen with dark hairs. All the tarsi dark.

Male, black, the whole face below the antennae yellow, and this colour is extended backwards along the margin of the eyes above the insertion of the antennae, as in *N. blackburni.* A line on the prothorax, the tubercles, all the tibiae, and the basal joints of the tarsi, yellow. The tibiae are spotted with black. Basal joint of the antennae dilated, not so wide as long, the sides strongly rounded. Thorax, dull with very fine and remote puncturation, propodeum more shining, and with some oblique wrinkles. Length 5—7 mm.

HAB. Kona, Hawaii (4000—6000 ft.). I have only seen the ♀ of this species, and the description of the ♂ is condensed from that given by Blackburn (*l.c.* supra). Although the coloration of the face is like that of several species of the *N. blackburni* group, I believe this species is more closely related to *N. facilis* and its allies.

(8) *Nesoprosopis volcanica*, sp. nov.

N. difficili simillima, ♂ antennarum articulo primo subtus levius arcuato, lamina supraclypeari angustiore, genis longioribus, segmenti 8^i apice longe bifurcato; ♀ genis longioribus, scutello magis opaco distinguenda. ♂♀. Long. 6—8 mm. (Plate II. figs. 12—12*b*.)

This species has the form and general appearance of *N. difficilis*, and the facial markings of the ♂ are similar to those of that species, and similarly variable. The legs are nearly always entirely dark, without yellow markings.

Male, with the scape of the antennae rounded on its posterior margin, about twice as long as wide, as in most of the foregoing species, but very distinctly less strongly arched beneath; cheeks between the mandible and eye longer, and the plate above the clypeus narrower in proportion to its height, than in *N. difficilis*. Mesothorax and scutellum dull from the surface rugulosity, clothed with long grey hairs, as also is the front of the head behind the antennae; wings clear in fresh examples. Process of the 8th ventral segment with long delicate bifurcations at its apex.

Female, very like the ♂ apart from sexual differences, the head and thorax being similarly clothed, the cheeks unusually long, the scutellum quite dull, the wings hyaline or subhyaline.

Hab. Hawaii, near the active crater Kilauea, where it is abundant. I have also taken it in the Kona district at a similar elevation (4000 ft.), and at the bottom of the crater of Haleakala, Maui (7000 ft.).

(9) *Nesoprosopis nivalis*, sp. nov.

Nigra, opaca, genis longissimis, capite et mesonoto pubescentia longa vestitis; ♂ capite, ut praecedentis, flavo-decorato, utrinque juxta oculos fortiter depresso; antennarum articulo primo fortiter dilatato, lateribus rotundatis, longiore quam latiore; ♀ scutello opaco, aequaliter distincteque punctato. ♂♀. Long. 6—8 mm. (Plate II. figs. 13 and 13*a*.)

Male, with the face very long and narrow between the eyes, the cheeks between the mandibles and eyes extremely long; the clypeus, the plate above it and a spot on each side of it, yellow; these markings are variable, the spots varying in size, and those outside the clypeus may be entirely wanting; antennae with the scape much more strongly dilated than in the preceding species, having both its anterior and posterior margins rounded, but its length is evidently greater than its width. The face is very deeply depressed at the sides, then strongly raised round the antennal fossae, forming a ridge which partly encircles them. Mesothorax dull, clothed with long grey hairs, the surface finely roughened, with very shallow, obscure and rather close puncturation; scutellum with close shallow punctures; the anterior area of the propodeum longitudinally rugose; the base of the posterior tibiae, and the basal joint of the posterior tarsi, pale. Abdomen with the 6th ventral segment emarginate at the apex, and carinated behind the emargination, its sides also emarginate; process of the 8th shortly bifurcated at the apex, or apparently sometimes truncate.

Female, very like the ♂ apart from sexual differences; entirely black, with the face very long between the eyes, and the cheeks extremely long; head and thorax clothed as in the ♂. Mesothorax dull, finely, closely and shallowly punctured; scutellum with very distinct, close, and even, but shallow puncturation; apex of the abdomen with pale hairs.

Hab. Haleakala, Maui, above the forest nearly to the summit of the mountain (10000 ft.). Frequents the flowers of *Cyathodes* etc. and is very abundant, but I took only a small series.

(10) *Nesoprosopis rugulosa*, sp. nov.

♀ nigra, griseopubescens, haud nitida, mandibulis truncatis, haud distincte dentatis; genis brevissimis; mesonoto densissime ruguloso, subtiliter punctato; propodei area antica irregulariter rugosa; abdominis segmentis ventralibus distinctius ciliatis; alis subhyalinis. ♀. Long. 6 mm.

Female, black, antennae with the flagellum sometimes pale beneath; head with grey pubescence, mandibles somewhat obliquely truncate at the apex, and not toothed; cheeks extremely short, so that towards the clypeus the base of the mandible nearly touches the eye; the clypeus is closely and very shallowly punctured, the punctures ill-defined; the suture of its lateral margins with the sides of the face somewhat deeply impressed; head above the antennae closely and rather largely, though shallowly punctured. Mesothorax with grey pubescence, its surface dull, densely and excessively finely rugulose, the puncturation fine, shallow and indistinct; scutellum more largely punctured; propodeum irregularly rugose in front. Abdomen with the basal segment hardly shining; intermediate ventral segments pale at their apices, and rather distinctly ciliated along them with white decumbent hairs.

Hab. Kilauea, Hawaii (4000 ft.), 2 ♀. I do not know the ♂.

(11) *Nesoprosopis vicina*, sp. nov.

♀ nigra, genis brevibus, capite supra antennas levissime rugoso, haud dense punctato; mesonoto aequaliter subtiliter punctato; propodeo antice longitudinaliter rugoso; abdominis segmento primo pernigro, nitido, subtilissime ruguloso; alis subhyalinis. ♀. Long. 6 mm.

This species is extremely like several of the preceding, but without doubt distinct. The mesothorax and scutellum are quite dull, smooth except for the very fine rugulosity of their surface, clothed with short pubescence, and finely and evenly punctured; the mesopleurae are not at all strigose or rough but are finely punctured. The basal segment of the abdomen is deep, black and shining; the apical segments clothed with dark pubescence.

HAB. Olaa, Hawaii (2000 ft.); a rare species. I took only two or three specimens, and have not seen the ♂.

(12) *Nesoprosopis koae*, sp. nov.

♀ nigra, praecedenti simillima, capite supra antennas minus opaco, et distinctius punctato; thorace minus opaco; alis infuscatis, ad apices subcaeruleo-iridescentibus, facile distinguenda. ♀. Long. circa 6 mm.

This is a very distinct species; the thoracic puncturation appears to be identical with that of the preceding, but the head above the antennae is less dull, and more distinctly punctured; the mesothorax less dull, and the scutellum somewhat shining.

The wings are entirely infuscate, with distinct bluish iridescence on their apical portion in certain lights. The longitudinal rugosity of the propodeum is unusually short. The basal segment of the abdomen deep black, and shining, as in the preceding, and the apical segments clothed with black hairs.

HAB. Mountains near Honolulu, Oahu (above 2000 ft.). A single specimen was taken in 1892. In March, 1897, three more females were taken from the blossoms of *Acacia koa*.

(13) *Nesoprosopis connectens*, sp. nov.

♂ niger, clypeo macula flava magna ornato, capite brevi, trans oculos lato, lamina supraclypeari latiore quam longiore; antennarum articulo primo haud fortiter dilatato; alis infuscatis; segmenti 8^i ventralis parte producta minus fortiter dilatata, apice bifurcato et ciliato. ♂. Long. 6 mm.

Male, black, the clypeus with a large yellow spot, the front tibiae yellow inwardly. Face short and wide across the eyes, the apical margin of the plate above the clypeus much longer than its side to the antennal fossa. Antennae with the scape about twice as long as wide, and strongly arched beneath. Head above the antennae finely rugulose, dull, and very shallowly punctured. Mesothorax and scutellum finely punctured, dull, the pubescence of the former short. Propodeum longitudinally rugose in front. Wings rather strongly infuscate, and with a slight blue iridescence. The process of the 8th ventral segment of the abdomen is evidently but not at all strongly dilated, its apical bifurcation more strongly so, and ciliated with long hairs.

HAB. A single ♂ was taken in the Iao valley, Maui. A female captured with it is evidently of the same species, and is very closely allied to *N. koae*, but this example is much mutilated. A single ♀ taken on Lanai is also extremely close to, if not identical with, one of these species.

(14) *Nesoprosopis melanothrix*, sp. nov.

Nigra, capite, thorace et abdominis segmentis apicalibus densius nigro-pubescentibus; propodei rugis longitudinalibus antice brevissimis, vel absentibus; mesonoto et scutello subaequaliter punctatis; alis infuscatis caeruleo-iridescentibus; ♂ capite prae antennis toto nigro, aut maculis tribus flavis ornato; antennarum articulo 1° fortissime arcuato, scutello opaco; ♀ scutello nitido, clypei apice distincte angulatim emarginato. ♂♀. Long. 6—8 mm. (Plate II. figs. 14—14*c*.)

Male, entirely black, except the testaceous front of the fore tibiae, or with the clypeus, and a spot on each side bordering the eyes, yellow, or with the latter markings only present; the clypeus is more or less emarginate at the apex, clothed with dark, and rather long, erect hairs, somewhat largely but shallowly punctured, the plate above it is similarly punctured, generally much wider than long, but variable in this respect; head above the antennae, and the vertex, with very long dark hairs, densely and rugosely punctured, and dull; antennae with the scape dilated, its posterior margin rounded but not strongly, the dilated surface evidently not twice as long as wide; beneath exceedingly strongly arched, so that when the anterior margin is viewed from in front the apex appears to be strongly produced, both base and apex being much thickened owing to the deep concavity of the part between. Mesothorax with long erect black hairs, shallowly and rather closely punctured, its surface dull and rugulose between the punctures; scutellum similarly clothed and dull, the punctures rather larger than those of the mesothorax; propodeum with very short ill-defined longitudinal rugosity in front, sometimes obsolete: behind this the surface finely rugulose, its sides clothed with pubescence of an obscure colour; wings infuscate, with blue iridescence; thorax beneath, and the legs with dark pubescence. Abdomen very finely rugulose, and hardly shining; beneath, shallowly punctured; 6th segment with the apex emarginate, and carinated behind the emargination; 8th with the process strongly dilated dorso-ventrally, the ventral edge densely hairy, its apex bifurcate, the bifurcations expanded, fringed with long hairs along their ventral margins.

Female, very like the ♂ in general sculpture, &c., clothed with similar dark pubescence; clypeus with its apical margin smooth and shining, and angulately emarginate; scutellum shining between the punctures which are distinct and even; propodeum often with a few very short wrinkles from its front margin, beyond these the surface smooth (except for the fine rugulosity of the surface), and slightly shining; wings quite dark, with very distinct blue iridescence; fifth and sixth ventral segments of the abdomen with long black hairs.

HAB. Haleakala, Maui (5000 ft.). In 1894 a small colony of this species was found burrowing in the hard dry trunk of a dead, but still standing, Ohia tree (*Metrosideros*). From this a short series of females was obtained, as they returned to their burrows. In October 1896 an enormous colony was found high up in a dead and decayed tree of *Straussia*, and most of the specimens examined (about 50 in number) were obtained as they flew wildly over the ferns in the immediate vicinity of the colony.

(15) *Nesoprosopis haleakalae*, sp. nov.

Nigra, capite trans oculos lato; mesonoto et scutello aequaliter punctatis; area propodei antica fortiter clathrate rugosa; alis fuscis; ♂ maculis tribus prae antennis flavis; antennarum articulo 1° dilatato, multo longiore quam latiore, margine antico subtus vix arcuato; segmenti ventralis 8^{i} productione fortius dilatata; metatarsis posticis saepe plus minusve pallidis. ♂♀. Long. 6—7 mm.

Male, with a spot on the clypeus, and one on each side of the face without it, yellow; front of the front tibiae, and sometimes all the tarsi testaceous; base of the posterior metatarsi generally more or less pale, sometimes only obscurely so; the facial markings are more distinct in some examples than others, but I have seen none in which they are wanting.

Face wide across the eyes, and strongly convex from the ocelli to the apex of the clypeus; the latter distinctly but shallowly punctured, clothed with long hairs, the plate above it wide and punctured; the scape of the antennae dilated, but much longer than wide, its anterior margin when viewed from in front almost straight beneath, not concave or arched; if, however, the under surface be examined, it will be seen to be deeply concave as in other species, only the concavity in this species does not extend quite so far as the anterior margin; head above the antennae with long dark hairs, exceedingly densely punctured towards the middle, where the close sculpture forms a distinct deep black area; thorax and scutellum dull, with erect dark pubescence, and closely and evenly punctured; the whole of the anterior area of the propodeum is somewhat coarsely clathrately rugose; abdomen with the apical process of the 8th ventral segment dorso-ventrally expanded, its bifurcate apex also dilated, and beautifully fringed with long hairs.

Female, apart from sexual characters very like the male; in some examples there is a very narrow yellow line along the inner margin of the eyes, or the head may be entirely black; face very wide, and very strongly convex longitudinally, with long dark pubescence; propodeum coarsely clathrately rugose to the brow, as in the ♂; apical segments of the abdomen beneath with dark hairs; wings in both sexes fuscous, often with slight blue iridescence towards the tips.

HAB. Haleakala, Maui (4000—5000 ft.). Not a common species; found flying round ferns in the forest. It is very distinct by the structure of the scape of the ♂, and the clathrate area of the propodeum in both sexes.

(16) *Nesoprosopis unica*, sp. nov.

♂ capite latissimo, fortius transverso, longitudinaliter fortiter convexo, clypei apice, et magnis duabus maculis extra clypeum, flavo; pronoto interrupte flavo-lineato: metatarsis pallidis; alis subfuscis; antennarum articulo primo dilatato, longiore quam latiore, subtus fortiter arcuato; area propodei antica breviter subreticulatim-rugosa. ♂. Long. circa 6 mm.

Male, head very wide, across the eyes decidedly transverse; face with a spot near the apex of the clypeus, and two large triangular ones bordering the eyes, and also a widely interrupted line on the hind margin of the prothorax, yellow; clypeus with its posterior margin extremely wide, the sides very little divergent thence as far as the apex of the eyes, evenly punctured, and clothed with rather long pale hairs; plate above the clypeus very wide, its anterior margin about equal to the combined length of its sides; face very convex longitudinally; the scape of the antennae dilated, subtriangular, its posterior margin rounded, longer than wide, beneath somewhat strongly arched; head above the antennae with the surface finely roughened, and somewhat closely punctured. Mesothorax and scutellum with dark erect pubescence, finely, regularly and closely punctured, the scutellum rather the more largely, and its surface slightly less dull than that of the mesothorax; anterior area of the propodeum subreticulately rugose along its front margin, behind this smooth except for the surface rugulosity; wings fuscous; the front of the front tibiae, and all the metatarsi, pale.

HAB. A single male taken in the mountains near Honolulu at an elevation of about 2500 ft. (1897).

(17) *Nesoprosopis laticeps*, sp. nov.

Praecedenti affinis, capite transverso, fortiter convexo, alis fuscis; ♂ antennarum articulo primo dilatato, longiore quam latiore, subtus fortiter arcuato; capite prae antennis ad latera flavo-maculato, vel toto nigro; ♀ propodei area antica brevissime antice rugosa; capite supra antennas in media parte subirregulariter punctato. ♂ ♀. Long. 6—8 mm. (Plate II. figs. 15—15 *b*.)

Male, face entirely black, or with two yellow spots, one on each side between the eye and clypeus; face transverse, the plate above the clypeus very broad, twice as wide as high; head above the antennae punctured, and clothed with obscure pubescence, as also the thorax; mesothorax dull, very finely punctured, scutellum somewhat more largely but not very closely; anterior area of the propodeum generally with some short rather strong longitudinal wrinkles at the extreme front. In some examples these are longer than in others and less regular, but they do not reach the posterior margin of the area, which has only the usual rugulose sculpture of the surface. Front legs pale in front, tarsi generally more or less testaceous; wings entirely fuscous with more or less blue iridescence; 8th ventral segment of the abdomen with the process dilated, as also its apical bifurcations.

Female, very like the male apart from sexual characters; head very wide and strongly convex, above the antennae very finely strigose and finely punctured, the punctures rather remote towards the middle; mesothorax and scutellum dull, clothed and punctured, as in the ♂; propodeum with the anterior area smooth, except for the rugulosity of its surface, and some extremely short wrinkles at the front margin, sometimes obsolete; wings as in the ♂, legs dark, apical segments with black hairs.

HAB. Dense wet forests high up on the mountains of Molokai, (above 4000 ft.). Not common, flying rapidly over ferns in places where the sunlight can penetrate the brush. On Lanai (2000—3000 ft.) the species is found of considerably smaller average size but (so far as I can see) inseparable from the Molokai examples by any constant character. The localities where it is found on Lanai are much less wet, and less heavily timbered, than those on Molokai, but appear to have been of much the same character before the forest had been so much thinned out and destroyed.

(18) *Nesoprosopis neglecta*, sp. nov.

Forma facieque praecedentis, capite supra antennas circa medium densissime rugoso-punctato, propodei area antica irregulariter fere tota rugosa, bene distincta. ♀. Long. 7 mm.

Of the same general form and appearance as the preceding but no doubt distinct. The head above the antennae is very densely subrugosely punctured, and the propodeum rather finely and irregularly rugose right up to the brow, whereas in *N. laticeps* the rugosity is extremely short, and the brow itself slightly shining.

HAB. Mountains of Molokai in the high boggy forest. Sept. 21st, 1893. 1 ♀ taken.

(19) *Nesoprosopis kauaiensis*, sp. nov.

Forma fere praecedentium, N. unicae cognatissima; alis subhyalinis; ♂ clypeo, et duabus extra clypeum maculis, pallide flavis; pronoto postice interrupte flavo-lineato; ♀ lineis duabus juxta oculos flavis, margine postico pronoti ad latera flavo-lineato. ♂♀. Long. 6—7 mm.

Male, with the scape of the antennae and the form of the head much as in the preceding species; clypeus almost entirely, a spot on each side of the face outside the clypeus, and the hind margin of the prothorax at the sides, very pale yellow; the posterior edge of the clypeus strongly rounded; head with long dark pubescence. Mesothorax dull, and closely punctured, densely clothed with black pubescence; scutellum closely and evenly punctured; propodeum with the anterior area longitudinally rugose in front, the rugosities short, not reaching the brow; posterior tibiae and tarsi normally dark, sometimes, when the abdomen is of a more or less reddish immature colour, they are more or less pale; 8th ventral segment of the abdomen much as in the allied species.

Female, in general sculpture and form like the ♂; two spots on the prothorax, and a line on each side of the face near the eyes, pale yellow; mesothorax and scutellum quite dull, evenly and closely punctured; propodeum with a few longitudinal wrinkles of moderate length, not reaching the brow; basal segment of the abdomen shining and very smooth; apical segments with dark hairs.

Hab. Mountains of Kauai (3000—4000 ft.); taken on several occasions, but scarce. The large pale markings of the face in the ♂, and the spotted collar and clear wings in both sexes, give this little species a very distinct appearance.

(20) *Nesoprosopis comes*, sp. nov.

Nigra, capite longitudinaliter minus fortiter convexo; mesonoto opaco, subtiliter minus dense punctato, pilis fuscis longioribus vestito; scutello haud nitido, minus dense subirregulariter punctato; propodei area antica subtiliter irregulariter rugosa; alis plus minusve infuscatis; ♂ clypei apice flavo-maculato; antennarum articulo primo dilatato, longiore quam latiore, subtus modice arcuato; segmenti 8^i ventralis productione fortiter dilatata. ♂♀. Long. 6 mm.

Black, the ♂ with a spot of variable size (which would probably be sometimes absent) on the clypeus near its apex; front of the front tibiae pale, as is usual in this sex of most species. Male with the face short, but not of the great width of the several preceding species, nor nearly so convex longitudinally; plate above the clypeus short, the length of its side to the antennal fossa less than that of its anterior margin; head above the antennae with long fuscous hairs, with very dense sculpture about the middle, forming an area of a more deeply black colour than that of the general surface; scape of the antennae dilated, but very evidently longer than wide, its posterior margin rounded, the anterior nearly straight; the front margin seen from in front moderately arched beneath, much less deeply concave than in *N. kauaiensis*, *laticeps*, &c., in which species the arch is highest near the apex, while in this species it is highest about the middle of the length of the scape. Mesothorax with long fuscous hairs, quite dull, very finely and not very closely punctured about the centre; scutellum very slightly less dull, and with rather larger puncturation, the punctures somewhat sparse and irregular, not close and even as in *N. kauaiensis*, &c.; propodeum quite finely irregularly rugose in front, the rugosity becoming less evident posteriorly, the actual brow somewhat less dull than the part in front. Apex of abdomen with dark hairs; 8th ventral segment strongly dilated dorso-ventrally, and the apical bifurcations also expanded; wings somewhat infuscate.

Female, very like the ♂, but the face entirely black, clothed with similar dark pubescence; head much less convex longitudinally than that of *N. kauaiensis*, &c.; above the antennae the surface rather shining, distinctly punctured, the punctures slightly decreasing in size inwardly; along the middle line the sculpture is very dense, forming a quite opaque area. Mesothorax very finely and rather remotely punctured, quite dull from the fine rugulosity of the surface between the punctures; scutellum very slightly shining at the sides, less dull than that of the ♂, somewhat sparsely and irregularly punctured; propodeum as in that sex; basal segment of the abdomen rather dull, impunctate, the surface distinctly finely rugulose; apical segments with dark hairs.

HAB. Haleakala, Maui (4000—5000 ft.); rare, three males and one female taken in company with *N. haleakalae* and *N. melanothrix*.

(21) *Nesoprosopis coniceps.*

N. coniceps, Blackburn, P. Manch. Soc. Vol. xxv. (1885—86), p. 145.

A species taken on Hawaii, and very closely allied to the preceding, is I believe referable to the above. In sculpture &c. it seems hardly to differ from *N. comes*. The clypeus has the basal part, the lateral margins and the extreme apex black, all the rest flavous, as well as two large triangular spots between it and the inner margins of the eyes; the base of the posterior tibiae and of the basal joint of the hind tarsi (and sometimes of the intermediate tarsi), are sometimes yellow; the process of the eighth ventral segment appears to be slightly less dilated than that of *N.*

comes. The female is somewhat variable, and I see no definite character to separate it from the single individual of that sex of the preceding.

Hab. Kilauea, Hawaii (4000 ft.), 1895 and 1896. Not common. Mauna Kea (6000 ft.), Rev. T. Blackburn.

(22) *Nesoprosopis dumetorum*, sp. nov.

Parvula, nigra, opaca, mesonoto subtilissime nec dense punctato, pilis nigris brevissimis vestito, propodeo antice brevissime rugoso, postice nitidulo; ♂ fronte tribus maculis flavis ornata; maculis quam praecedentis minoribus; pronoto utrinque, cum tuberculis et tibiarum basi, nonnunquam flavo-notato, nonnunquam his omnibus nigris; articuli antennarum primi margine antico subtus vix arcuato; ♀ duabus juxta oculos lineis flavis; pronoto postice ad latera, tuberculis, tegulis plerumque, cum basi tibiarum flavo-notatis; capite longitudinaliter fortissime (maris minus fortiter), convexo. Long. 4·5—6 mm.

In the male a spot near the apex of the clypeus, and one on each side of the face bordering the eyes, are yellow. These spots are generally much smaller than in *N. coniceps* though sometimes nearly as large; prothorax on each side, the tubercles, and the base of the tibiae, sometimes spotted with yellow, but more often all these are black. The head is shaped very like that of the two preceding species, but the front margin of the scape of the antennae is nearly straight, hardly arched, beneath; face above the antennae dull, and very densely and finely punctured about the middle, with a large deep-black area in contrast with the rest of the surface and on which the sculpture is exceedingly dense. Mesothorax very finely punctured, clothed with very short dark pubescence; scutellum with slightly larger punctures, but fine and not very close; propodeum rugose at the extreme front, behind this part the surface only rugulose, the brow sometimes, at least in certain aspects, slightly shining. Abdomen with the basal segment dull, with distinct surface rugulosity; eighth ventral segment with the process dilated, much as in *N. coniceps*; wings sometimes somewhat infuscate, but often hyaline.

Female, small, and very like the ♂ in most respects; face with only a narrow line along the eyes yellow; posterior margin of the prothorax at the sides, a spot on the tegulae (sometimes wanting), one on the tubercles, the whole front of the anterior tibiae, the extreme base of the intermediate, and the base of the posterior tibiae more widely, yellow; face strongly convex longitudinally, above the antennae hardly shining, but not so dull as in the ♂, and without the deep-black dull area of that sex, finely and closely punctured; mesothorax clothed, as in the ♂, with exceedingly fine puncturation, its surface quite dull; scutellum dull, very finely punctured, but quite evidently more strongly so than the mesothorax, the punctures not very close; propodeum with very short rugosities at its anterior margin, behind these the surface finely rugulose, and about the brow in certain aspects quite brightly shining, as also beyond it; apical segments of the abdomen with blackish hairs.

HAB. Hawaii from 2000—4000 ft. Taken in the heart of dense damp forests in places where a little sunlight penetrates, and may also be found at the edges of such forests. I have examined many examples. It is quite a distinct species, though the ♂ is very variable in colour.

(23) *Nesoprosopis mutata*, sp. nov.

Praecedenti magnitudine forma et colore simillima, ♂ capite supra antennas minus distincte punctato, et plaga pernigra carente, scutello vix opaco, segmenti 8^i ventralis parte producta haud dilatata, antennarum articuli basalis margine antico subtus distincte arcuato; ♀ scutello laeviore et nitido, tibiis posticis haud flavo-notatis bene distincta. Long. 5·5 mm.

This species represents on Kauai the *N. dumetorum* of Hawaii but is quite distinct. The head is similarly formed, but above the antennae the surface is rougher and the puncturation less distinct, and the ♂ lacks entirely the deep-black mark so conspicuous in the preceding; the scutellum of the ♂ is decidedly less dull, of the ♀ even shining; the eighth ventral segment has the process of a quite different form, not being dilated dorso-ventrally, nor evidently bifurcate at its apex.

The two males taken have the facial markings as in *N. dumetorum*, the tubercles, prothorax and legs black, as in some varieties of that species; the single ♀ has the tegulae unspotted as in some examples of *dumetorum*, and the base of both posterior and intermediate tibiae also dark.

HAB. Kauai (3000 ft.); 2 ♂, 1 ♀ in a dense forest, flying over ferns in a sunny spot.

(24) *Nesoprosopis specularis*, sp. nov.

♀ nigra, praecedentibus simillima; capite supra antennas minus subtiliter punctato; spatio verticis, inter ocellum exteriorem et oculum sito, laevissimo nitidoque, ne minime quidem ruguloso; clypei apice flavo-lineata, distinguenda. Long. 5·25 mm.

Female, like the preceding in size and general appearance, but the following characters will readily distinguish it. The head above the antennae is exceedingly closely and, for the size of the insect, rather strongly punctured: the surface between the punctures is smooth and shining; the spaces connecting the exterior ocelli with the impressed longitudinal lines bordering the eyes are extremely smooth and shining, and the apical margin of the clypeus is yellow. The scutellum is perhaps hardly so dull as in *N. dumetorum*, but more so than that of *N. mutata*. Besides the line on the clypeus there is a long and rather broad yellow line along the inner margin of the eyes; the posterior margin of the prothorax at the sides, the tubercles, and the base of the posterior and intermediate tibiae are also marked with yellow; the clypeus is less convex longitudinally than that of *N. dumetorum*.

HAB. Hawaii; very rare, a single specimen only taken at Kilauea.

(25) *Nesoprosopis crabronoides*, sp. nov.

♀ nigra, angustula, capite supra antennas subnitido, dense distincteque punctato, vertice fortissime incrassato; mesonoto et scutello opacis, subtilissime punctatis. Caput prae antennis maculis duabus flavis lateralibus ornatum, pronoti margine postico ad latera, tuberculis, basique tibiarum, flavo-notatis. Long. 4·5—5 mm. (Plate II. fig. 2 and 2 *a*.)

Female, narrow and elongate, the face with two yellow lateral spots, and sometimes an obscure one near the apex of the clypeus; an interrupted line on the prothorax posteriorly, the tubercles, and the base of the tibiae, also yellow; head with the vertex extraordinarily incrassate, the face exceedingly strongly convex longitudinally, distinctly punctured behind the antennae, the surface between the punctures shining, as also the smooth spaces adjoining the exterior ocelli. Mesothorax very dull and finely punctured, clothed with short pubescence, scutellum with fine sparse puncturation; propodeum shortly rugose at the extreme front of its anterior area, which otherwise is very finely rugulose and shining: abdomen narrow and subelongate.

HAB. Kilauea, Hawaii (4000 ft.); rare.

This minute and remarkable species cannot be confounded with any other of the Hawaiian bees known to me. Its resemblance, when on the wing, to a minute species of *Crabro* is very great. A few burrows were found in the hard trunk of a large dead tree, which was still standing. Though I visited this tree on many occasions I took but few specimens—all females—the males neither coming to the burrows, nor visiting the flowers in the immediate vicinity.

(26) *Nesoprosopis mauiensis*, sp. nov.

N. mutatae simillima; ♂ clypeo nigro; extra hunc flavis duabus maculis; pronoto, tuberculis, tibiisque posticis haud flavo-notatis; capite supra antennas subrugose punctato; antennarum articulo primo fortius dilatato, margine antico subtus distincte arcuato; ♀ capite juxta oculos et margine postico pronoti ad latera, flavo-lineatis; tuberculis, tibiisque posticis haud flavo-notatis; scutello opaco. Long. 5·75 mm.

Male, with only a line bordering the inner margins of the eyes yellow, the clypeus, prothorax, tubercles and hind tibiae black ; antennae with the scape rather more dilated than the other small and narrow species, its anterior apical angle somewhat prominent, and bent downwards, the front margin distinctly arched beneath ; head above the antennae clothed with long sparse pubescence, and having an area about the middle of a deeper black than the general surface, but less distinctly marked than that of *N. dumetorum* ; in front of this are two smooth spaces corresponding in shape to the dilated scape. Mesothorax and scutellum dull, with very minute punctures ; propodeum at its anterior margin with extremely short rugosity, behind which the anterior area is smooth except for the fine surface rugulosity, and slightly shining ; 8th ventral segment of the abdomen with the process and its apical bifurcations dilated.

Female, with a narrow yellow line along the margins of the eyes, and one on each side of the hind margin of the prothorax yellow ; head above the antennae with the surface shining (except narrowly in the middle), finely and closely punctured ; mesothorax dull, and very finely punctured ; scutellum also dull, finely and somewhat remotely punctured ; anterior area of the propodeum with only the fine general surface rugulosity and shining in certain aspects ; wings clear and iridescent.

This species may be known from its ally on Kauai by the more dilated scape of the antennae, the entirely black clypeus, and different sculpture above the antennae of the ♂ ; the ♀ by the dull scutellum, and the more shining and more distinctly punctured head above the antennae ; from *N. dumetorum* the distinctly arched anterior margin of the scape of the antennae beneath will distinguish the ♂, the black legs and tubercles the ♀.

HAB. Haleakala, Maui (5000 ft.). A pair (♂ and ♀) were dug out of a burrow, which was made in a very hard tree trunk, in April 1894. Subsequent visits in 1895 and 1896 failed to produce further specimens.

(27) *Nesoprosopis angustula*, sp. nov.

Nigra, *N. dumetorum* cognatissima, antennis ejusdem formae ; ♂ frontis plaga pernigra vix distincta ; ♀ capite tibiisque posticis nigris, haud flavo-notatis, illo supra antennas subnitido, distinguenda. Long. 5—6 mm.

Very close to *N. dumetorum*, the ♂ with the scape of the antennae similarly formed. Male with a yellow spot at the apex of the clypeus, and a well-marked triangular one along the inner margin of each eye ; tubercles, posterior and intermediate tibiae and tarsi, black ; head above the antennae very densely punctured about the middle, where there is no very distinct deep-black area, differing greatly from the surrounding sculpture. In *N. dumetorum* on close examination that area is found to be formed of a patch of extremely short and close-set black pubescence. Female with the face entirely black, the prothorax with small lateral yellow spots, and the tubercles are also marked with yellow; intermediate and posterior tibiae and tarsi black; head above the antennae especially towards the vertex distinctly shining between the closely-set punctures.

Hab. Lanai (2500 ft.); January 1894, very rare; 2 ♂, 1 ♀ only taken.

(28) *Nesoprosopis dimidiata*, sp. nov.

♂ capite prae antennis fere toto flavo, tibiis tarsisque flavis, illis nigro-maculatis, horum articulis apicalibus plus minusve infuscatis, tuberculis pronoti flavo-notatis; capite supra antennas dense ruguloso, minus distincte sparsim punctato; antennarum articulo primo multo longiore quam latiore, subtus modice arcuato; ♀ nigra, angustula, tibiis intermediis et posticis ad basim breviter pallidis; mesonoto cum scutello opaco, subtilissime punctato. Long. 5 mm.

Male, with the whole of the face below the antennae, except the upper part of the plate above the clypeus, yellow; antennae with the scape dilated, but considerably longer than wide, its anterior margin moderately arched beneath; head above the antennae dull, with the surface very finely roughened, and very shallowly, somewhat remotely punctured. Mesothorax dull and finely punctured; scutellum dull with shallow and not very close puncturation; propodeum with the anterior area rugose at the extreme front, otherwise only finely rugulose and dull, hardly shining even at the brow; tubercles of the prothorax with a yellow spot, all the tibiae and tarsi bright flavous, the front tibiae with a black spot behind, the intermediate and posterior with a black ring; apical joints of the tarsi more or less obscured in colour; pubescence of head, thorax and legs pale: the process of the eighth ventral segment dilated.

Female, entirely black, except the front of the anterior tibiae, which are yellow, the flagellum of the antennae, which is testaceous beneath, and the extreme base of the middle and posterior tibiae, which have a yellow spot. Face not at all strongly convex longitudinally, above the antennae rather shining, and finely punctured; mesothorax and scutellum quite dull, with exceedingly feebly impressed punctures; scutellum with very sparse, almost obsolete puncturation; propodeum with hardly any distinct rugosity at its anterior margin, the whole anterior area being very densely rugulose and dull, the brow shining in certain aspects, dull in others; basal segment of the abdomen hardly shining, the apical segments with pale hairs.

Hab. A single ♂ taken in Kona, Hawaii, at an elevation of 4000 ft. (Aug. 1892). The ♀ I have here described came, I believe, from the same locality, but unfortunately the locality label was lost.

(29) *Nesoprosopis blackburni.*

Prosopis blackburni, Smith, J. Linn. Soc. XIV. p. 682. Blackburn and Cameron, P. Manch. Soc. XXV. (1885–86), p. 143.

(Plate II. fig. 16—16 *d.*)

Male, with the whole face below the antennae bright yellow, which colouring is continued upwards behind them rather broadly along the margins of the eyes; labrum, the mandibles more or less, the tubercles and all the tibiae and tarsi are yellow, the tibiae generally with a testaceous stain or a black spot behind; the scape of the antennae has the front half of its upper surface yellow, and the flagellum fulvous or even yellow beneath. Face subrotundate, the cheeks between the eyes and mandibles very short; scape of the antennae hardly dilated, twice or more than twice as long as wide, the anterior margin widely but not deeply arched beneath; the plate above the clypeus is rather short but not wide; head above the antennae hardly shining, shallowly punctured, very densely in the middle immediately behind the antennae, with only a very short inconspicuous pale pubescence. Mesothorax rather smooth, the surface rugulosity being exceedingly fine, very finely and evenly punctured, and clothed with short pubescence; scutellum slightly shining; propodeum with its anterior area more or less longitudinally rugose; eighth ventral segment with the process dilated, and bifurcate at the apex, the bifurcations fringed with long hairs.

Female, with only the front of the anterior tibiae, and the under side of the flagellum of the antennae pale. Head very little convex longitudinally, above the antennae with only very short scanty pale pubescence, distinctly punctured, the surface between the punctures somewhat shining, at least in certain aspects; cheeks very short; mesothorax with very short pubescence, rather smooth but not shining, very finely and evenly punctured; scutellum shining, very finely but not very closely punctured; propodeum with the anterior area more or less longitudinally rugose in front and subopaque; legs and apex of the abdomen with pale hairs; wings clear. Length 5—6·75 mm.

HAB. Maui, but only on the coast and lowlands; common on the sandhills at Wailuku and near the coast at Lahaina.

The ♂ is very distinct from any other species, the ♀ is very like some of the following. This is the species described by Smith in his paper in J. Linn. Soc. (XIV. pp. 674—685), the types being in the British Museum. Mr Blackburn clearly had several quite distinct species before him, when he subsequently made some remarks on what he supposed to be *N. blackburni*. (P. Manch. Soc. *loc. cit.*)

(30) *Nesoprosopis longiceps*, sp. nov.

Praecedenti affinis, capite elongato, supra antennas densissime punctato, mesonoto opaco dense aequaliter punctato, propodei area antica rugosa, abdomine haud nitido, alis haud infuscatis; ♂ colore fere praecedentis sed mandibulis, pronoti tuberculis, antennarum articulo basali, tibiis posticis et intermediis (basi extrema excepta) nigris; tarsis omnibus plerumque flavis vel pallidis, rarius piceis. Long. 5·75—8·5 mm. (Plate II. fig. 3.)

Male, with facial markings like those of *N. blackburni*, but with the mandibles, the scape of the antennae, and generally the labrum, black; face extremely narrow between the eyes and longer than its greatest width across them; plate above the clypeus very narrow and elongate; head above the antennae very densely punctured, especially over the middle portion, the surface dull with short inconspicuous pale pubescence; the cheeks between the mandibles and eyes short; scape of the antennae twice or more than twice as long as wide, its anterior margin widely and shallowly arched beneath, the flagellum beneath fulvous. Mesothorax and scutellum hardly shining (often quite dull), closely and evenly punctured, clothed with grey pubescence; propodeum with the anterior area irregularly rugose to the brow—more strongly so in some examples than in others; wings in fresh specimens very clear, with dark neuration. Abdomen dull, without definite puncturation; eighth ventral segment with its process somewhat dilated, bifurcate at the apex, the bifurcations somewhat narrow and fringed with long hairs. The legs are variable in colour, but all the tarsi are generally yellow or at least pale; the posterior and intermediate tibiae are black with a yellow spot at the base and sometimes at the extreme apex; tarsi rarely entirely piceous.

Female, without yellow facial markings; the anterior tibiae pale in front; antennae with the flagellum fulvous beneath; face very long and narrow for this sex, the apex of the clypeus slightly emarginate; head above the antennae finely and very densely punctured (at least except at the extreme sides), dull, with short inconspicuous pale pubescence, the whole front hardly at all convex longitudinally. Mesothorax and scutellum closely and evenly punctured, not shining; anterior area of the propodeum rugose, more strongly so in some examples than in others, sometimes irregularly, sometimes more or less longitudinally. Abdomen dull, impunctate, the apical segments with pale hairs; legs black with silvery pubescence; wings in fresh examples almost or quite clear.

HAB. Coast and lowlands of Molokai, Lanai, and Maui.

OBS. Sometimes examples are taken which have the abdomen more or less of an immature-looking red colour—the so-called 'highly-coloured' varieties of Smith and others. Such individuals are liable to differ also in sculpture and other respects from typical specimens, not only in this, but also in other species.

(31) *Nesoprosopis obscurata*, sp. nov.

Praecedenti simillima, sed ♂ colore flavo tantum anguste supra antennas producto, lamina supraclypeari tota, vel ex parte, nigra, minus elongata, tibiis posticis et intermediis nigris; ♀ capite supra antennas minus dense punctato, inter puncta laeviori, scutello subnitido et laeviori, alis infuscatis, distinguenda. Long. 6—8·5 mm.

Very closely allied to *N. longiceps*, but the ♂ with the head rather less elongate, the plate above the clypeus decidedly wider, and entirely or partly black, the yellow markings of the face only very narrowly produced behind the antennae; the posterior and intermediate tibiae are not pale at the base, the posterior tarsi black or piceo-testaceous; wings more or less distinctly infuscate.

Female, with the head rather less densely punctured above the antennae, than in the preceding, the surface between the punctures smoother and less dull, the scutellum somewhat shining, the wings quite infuscate, and the face somewhat wider.

Hab. Coast or lower slopes of the mountains of Molokai and Lanai; coast of Hawaii (Kealakeakua Bay). Rare.

Obs. I have taken the specimens from Hawaii as types. It is uncertain whether they will prove specifically identical with those from the other islands, but the material taken is insufficient to settle this point.

(32) *Nesoprosopis flavipes*.

Prosopis flavipes, Smith, Cat. Hym. Ins. pt. I. p. 23; Blackburn and Cameron, P. Manch. Soc. xxv. (1885–86), p. 149.

"Male. Length 2¼ lines. Black; the face yellow, the colouring is continued upwards on each side nearly to the vertex of the eye; the scape cylindrical, black, the rest of the antennae orange, yellow beneath. Thorax, the metathorax has no distinctly enclosed space, and is subrugose; the wings hyaline, the nervures dark fuscous, all the tibiae and tarsi bright yellow, the former have a ferruginous stain behind. Abdomen smooth and shining, the margins of the segments narrowly rufotestaceous."

"Hab. Sandwich Islands."

The above description is taken from Smith's work (*l. c. supra*). The species is represented by a single example brought home by the Beechey expedition. Probably it represents on Oahu the *N. finitima* of Kauai, and *N. longiceps* of Molokai, &c. Although very closely allied I believe it to be distinct from either of these species.

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(33) *Nesoprosopis finitima*, sp. nov.

N. longicipiti cognata, eodem colore et magnitudine sed mesonoto et scutello subtilius punctatis; ♀ capite etiam minus elongato, et pro longitudine latiore distinguenda. Long. 7 mm.

♂ with the face shaped and coloured as in *N. longiceps*, but with the puncturation of the mesothorax and scutellum distinctly finer; the ♀ is more distinct, the difference between the puncturation of its mesothorax and scutellum and that of *longiceps* being more evident, and its head is evidently shorter and wider.

Hab. Kauai, on the coast at Makaweli in 1894; a single pair only taken. It must be a very scarce species in this and other localities where I searched for it, as I was never able to take another specimen.

(34) *Nesoprosopis anthracina*.

Prosopis anthracina, Smith, Cat. Hym. Ins. I. p. 23.

Prosopis rugiventris, Blackburn and Cameron, P. Manch. Soc. xxv. (1885–86), p. 146.

(Plate II. fig. 17—17 *d.*)

Male, with the clypeus, the plate above it and a spot on each side of it yellow, the greater part of the face in front of the antennae being of this colour; front of the anterior tibiae more or less flavous; legs black, with the tarsi sometimes piceous or testaceous. Head elongate, longer than its width across the eyes, above the antennae dull, rugulose, and shallowly punctured, without any excessively finely and densely punctured area, clothed with short inconspicuous pubescence; scape of the antennae dilated, strongly rounded on its posterior margin, little or not at all on the anterior, evidently but not greatly longer than its greatest width, the front margin viewed from in front deeply arcuate beneath. Thorax and scutellum dull, evenly and closely punctured; propodeum with its anterior area rugose, sometimes rather regularly longitudinally, sometimes quite irregularly, the rugosities much stronger in some individuals than others; seen from in front the rugosities extend to the brow, which is not at all smooth or shining. Abdomen dull, the intermediate ventral segments often raised transversely across the middle; when strongly raised, then generally the surface is smoother and more shining, but extremely variable in this respect; process of the eighth ventral segment not much dilated dorso-ventrally, the apex bifurcate and fringed with long hairs.

Female, black, with only the flagellum of the antennae beneath, and the front of the anterior tibiae pale. It closely resembles the ♂ in form and sculpture; the clypeus is slightly emarginate at its apex; the head above the antennae quite dull and rugulose, shallowly punctured as in the ♂. Scutellum dull, rugulose between the punctures, which are close and even. Abdomen dull, the apical segments with dark hairs. Wings in both sexes clear, or clouded across the middle. Length 5·5—7·5 mm.

Hab. Coast and lowlands of Molokai, Lanai, and Maui; abundant. Oahu (Honolulu and Waianae); Kealakeakua Bay, Hawaii.

Obs. Most of the examples (♂) from the intermediate islands have the ventral segments transversely ridged more or less strongly, but in some the ridges are obsolete, and then the surface is generally duller and more or less evidently punctured; Oahuan specimens are generally of the latter form, but sometimes the ridges are quite strongly developed. The ♂ is quite distinct from any other except the slightly modified form next described, although its general appearance is extremely similar to that of *N. facilis* and others. The ♀ is very like that of *N. longiceps* and *blackburni*, to which it is really closely allied, but the much less densely punctured head behind the antennae will easily separate it from the former; the longer face, and the duller and more closely punctured scutellum, from the latter.

(35) *Nesoprosopis flavifrons.*

Prosopis flavifrons, Kirby, Ent. Mo. Mag. XVII. p. 85. Blackburn and Cameron, P. Manch. Soc. XXV. (1885–86), p. 144.

(Plate II. fig. 18—18*b*.)

Male, like the preceding in general form and colour; scape of the antennae often with the anterior margin more or less pale, and evidently more strongly dilated than that of *N. anthracina*, subcordiform in shape, the anterior margin distinctly rounded as well as the posterior; the face is also rather wider, and the eighth ventral segment has the process rather strongly dilated. I see no character whereby the females of the two forms can be separated. Length 5·5—7·5 mm.

Hab. Coast of Kauai, not rare; many males were taken in January, 1897, but only two or three females. I have seen cells of this species formed in dead twigs.

(36) *Nesoprosopis assimulans*, sp. nov.

N. obscuratae cognata, et colore simillima; ♂ antennarum articulo primo magis dilatato, margine posteriore fortius rotundato; ♀ mesonoto subtilius punctato bene distincta. Long. 6·75—9·5 mm.

(Plate II. fig. 19—19*b*.)

Male, with the greater part (often nearly the whole) of the clypeus, and a large subtriangular mark on either side of it which reaches as high, or a little higher than the base of insertion of the antennae, yellow; the lateral triangles are always divided from the yellow of the clypeus by more or less narrow black lines; the plate above the clypeus is entirely black. In form the species is very like *N. obscurata*, but the following characters will easily distinguish it. Male with the scape of the antennae evidently more strongly dilated, its posterior margin more strongly rounded; puncturation of the mesothorax and scutellum rather finer, these parts being very dull, with very close and shallow punctures. The ♀ may be known at once by the exceedingly minute shallow puncturation of the mesothorax, that of the scutellum being only slightly more distinct, and the surface of both quite dull. Wings more or less distinctly clouded, especially across the middle portion.

Hab. Mountains of Lanai (2000 ft.) and on the coast at Awalua. Wailuku, Maui on the sandhills, and at Lahaina. Not common.

Nesoprosopis assimulans var. *oahuensis*, var. nov.

♂ maculis flavis minoribus, ♀ alis fortiter infuscatis distinguenda.

Agrees with the former in structure, but the ♂ has the yellow markings of the face often much reduced in size, and the wings generally darker; ♀ with the wings entirely infuscate, and in certain lights with a distinct steely iridescence.

Hab. Waialua and Waianae (Oahu), on the coast, or a few hundred feet above sea level.

(37) *Nesoprosopis inquilina*, sp. nov.

Nigra, opaca, griseo-pubescens, alis hyalinis; ♂ clypeo fere toto, maculisque duabus triangularibus extra clypeum, late supra antennas productis, flavis; lamina supraclypeari tota, vel ex majore parte, nigra; antennarum articulo primo fortius dilatato, apice antice producto; ♀ capite nigro, trans oculos lato, mesonoto opaco, levissime punctato, tarsis anterioribus pilis brevioribus, vix curvatis, vestitis. Long. 7 mm.

Male, with the clypeus almost entirely, and the sides of the face between it and the eyes, yellow; the latter markings produced rather widely above the antennae along the margin of the eyes; plate above the clypeus entirely or almost entirely black; anterior tibiae and tarsi pale in front; tibiae of the intermediate and posterior legs sometimes with a yellow spot at the extreme base, and slightly pale at the apex, their tarsi black or piceous.

Face much shorter and wider than that of *N. longiceps*, the scape of the antennae somewhat strongly dilated, and of peculiar form, as its anterior apical angle is somewhat produced; head above the antennae closely, subrugosely and very shallowly punctured. Mesothorax dull, with grey pubescence, and very shallow ill-defined puncturation; the scutellum with very similar sculpture; propodeum with the anterior area entirely dull, rugose to the brow. Abdomen dull, with rugulose surface; the first, second, and third segments with a short fringe of pale decumbent hairs, at least at the sides, but these bands are very easily abraded; process of the eighth ventral segment dilated, and densely clothed with long hairs on the ventral side, and the apical bifurcation fringed. Wings clear in fresh specimens.

Female, black, with the anterior tibiae testaceous in front. The face is wide across the eyes, in certain positions appearing even transverse; the apex of the clypeus slightly emarginate; head above the antennae quite dull, and shallowly punctured. Mesothorax dull, with fine, indefinite punctures, these being very shallow, and the general surface rugulose; scutellum also dull and similarly punctured; propodeum as in the ♂. Abdomen dull, the apical margins of the segments widely pale, apical segments with pale hairs; front legs with the intermediate joints of the tarsi with somewhat short hairs, quite different from the long, curved, and regularly disposed ones of all the preceding species.

HAB. Kilauea, Hawaii (4000 ft.). Very rare. I took a ♂ and ♀ in company in December, 1896, and a single ♂ on each of two previous visits to the same locality. The ♀ is somewhat abraded and shows no trace of lateral pubescent streaks, but I suspect they would be present in a fresh example.

OBS. This and the four following species are parasitic on certain of the species already described. The females are easily known from those of the industrial forms by the degeneration of the sweeping hairs on the front tarsi. The males however seem to show no important points of distinction.

(38) *Nesoprosopis hilaris*, Sm.

Prosopis hilaris, Smith, J. Linn. Soc. XIV. p. 683. Blackburn and Cameron, P. Manch. Soc. XXV. (1885–86), p. 147.

Male, with the whole face below the antennae bright yellow, and this colouring is produced above the line of insertion of the antennae broadly along the border of the eyes; mandibles ferruginous with a yellow line; scape of the antennae yellow on the anterior half of its dilated surface, fulvous on the posterior; abdomen with the basal segments ferruginous. Antennae with the scape dilated, evidently longer than wide, but not nearly twice as long; head above the antennae dull, somewhat rugosely punctured. Mesothorax with grey pubescence, dull, and evenly punctured; scutellum with similar sculpture; propodeum rugose to the brow; apical segments of the abdomen with narrow fasciae of white pubescence along their apical margins; all the tibiae and tarsi fulvous.

Female, like the ♂ in sculpture, cheeks, clypeus and the face at the sides, as well as the antennae, more or less red; the clypeus distinctly emarginate at its apex; the face wide across the eyes; intermediate tibiae almost entirely pale, their apex only narrowly fuscous, the posterior widely pale at the base, their apical half generally more or less fuscous; the intermediate and posterior trochanters both red or pale; wings in both sexes clear. Length, 5—8 mm.

Hab. The sandy Isthmus between East and West Maui; also found on the coast of Lanai at Manele. In both cases the closely allied species *N. volatilis* Sm. is found with it, but apparently that species alone frequents the neighbouring island of Molokai, as the present species was not found there. *N. volatilis* extends its range far up the mountains—as high as eight or nine thousand feet—but *N. hilaris* is confined to sandy localities near the coast. Individuals vary greatly in size; on Maui the small examples breed in the cells of *N. blackburni* and probably of *N. anthracina*, the large ones in the cells of *N. assimulans*. The delicate fringe of white pubescence on the apical margins of the apical segments is very easily destroyed, but the present species could easily be distinguished from *N. volatilis* by this character, as they flew together over the sand.

(39) *Nesoprosopis hostilis*, sp. nov.

Praecedenti forma et colore simillima; segmentis abdominis apicalibus pubescentia haud fasciatis; ♂ articulo primo antennarum antice pallido, postice nigro; tibiis posterioribus et intermediis basi anguste pallidis; ♀ capite flavis duabus maculis juxta oculos ornato, tibiis posterioribus basi anguste flavis distinguenda. Long. 5—6 mm. (Plate II. fig. 4, also fig. 20—20 *b*.)

Very closely allied to the preceding species, from which it seems hardly to differ in sculpture, although it is a rather more shining insect than any of the other parasitic species.

Male, with the face coloured as in *N. hilaris*, the yellow markings being produced behind the antennae rather broadly along the borders of the eyes; mandibles without a yellow line; scape of the antennae with the upper surface pale only on its anterior part, the posterior being black or nearly so; intermediate and posterior tibiae dark, pale at the base outwardly for only a short distance.

Female, with a yellow (generally triangular) spot on each side of the face, surrounded by reddish colour, with which they gradually become blended; the legs coloured much as in the ♂. The range of colour in the ♀ is quite different from that of the allied species, the prothorax, the mesothorax at the sides and the propodeum wholly or in part being generally red or reddish.

HAB. Mountains of Kauai (3000—4000 ft.) in various localities. Parasitic on *N. laeta*, and probably other species.

(40) *Nesoprosopis volatilis.*

Prosopis volatilis, Smith, J. Linn. Soc. XIV. p. 683. Blackburn and Cameron, P. Manch. Soc. XXV. (1885–86), p. 148.

Closely allied to *N. hostilis* but duller. In the ♂ the yellow colour is less widely produced along the eyes behind the antennae; the scape of the antennae is coloured like that of *N. hostilis*, but the pale colour is often much diminished, and sometimes absent in Oahuan specimens, which are in general duller, and have the yellow markings more clouded, or reduced in size, than examples from Molokai and Lanai. The ♀ has the face below the antennae red without yellow markings; the intermediate and posterior trochanters are of an obscure colour, or quite black. The wings in both sexes are less clear than those of *N. hilaris*, and the margins of the abdominal segments are without a fringe of pubescence. Length 5—8·5 mm.

HAB. Oahu, Lanai, Molokai and Maui, both on the coast and in the mountains —as high up as 8000 ft. on Haleakala. I have taken remarkably large specimens at Waianae, Oahu, in company with *N. assimulans var. oahuensis*—a large species—on which no doubt they were parasitic. It also attacks *N. facilis*, *N. difficilis*, and other species.

(41) *Nesoprosopis sphecodoides*, sp. nov.

Praecedentibus affinis, ♂ abdomine toto nigro, vel nonnunquam segmento basali plus minusve obscure rufo vel piceo, antennarum articulo primo nigro; ♀ capite prae antennis toto nigro distinguenda. Long. 5—7 mm.

Male, with the abdomen entirely black, or with the basal segment sometimes more or less obscurely reddish; clypeus with a yellow spot extending from its base to about three-fourths of its whole length, and outside it there is a triangular spot on each side of the face; these spots are separated by more or less black between them, and they are variable themselves, being much reduced in size in some examples; scape of the antennae entirely black. Superficially the ♂ bears a close resemblance to some of the non-parasitic species, but the inconspicuous pubescence of the front of the head above the antennae, the closely punctured scutellum, and the propodeum, which is rugose right up to the brow, will generally distinguish it. The ♀ is black with the basal and more or less of the second segment of the abdomen ferruginous; the face is entirely black, the clypeus at the most showing a slight tinge of obscure red; posterior and intermediate tibiae black or of an obscure colour.

Hab. Hawaii, both sides of the island, at an elevation of 4000 ft. Parasitic on *N. difficilis* and probably other species.

Obs. The five parasitic species above described are extremely closely allied to one another, but I believe them to be sufficiently distinct. They all agree in having the vertex of the head somewhat incrassate, the scutellum closely and evenly punctured, the propodeum rugose to the brow, and the head between the antennae and the vertex with only an inconspicuous pubescence, the latter character being characteristic of the *blackburni* group of non-parasitic species, to which I believe these are closely allied. The males (except *N. inquilina*) all have the scape similarly formed; the females have the apex of the clypeus distinctly emarginate, and the sweeping hairs of the anterior tarsi in an evidently degraded condition.

(42) *Nesoprosopis fuscipennis.*

Prosopis fuscipennis, Smith, J. Linn. Soc. xiv. p. 682. Blackburn and Cameron, P. Manch. Soc. xxv. (1885–86), p. 140.

A very large species, the ♂ with the face black, deeply depressed along the eyes, the depressions dull; clypeus with shallow punctures, and a few hairs along the apical margin. Scape of the antennae strongly dilated, closely and finely punctured, both front and hind margins rounded, the latter much the more strongly, the former with a white line, seen from in front the front margin is very strongly arcuate beneath; head above the antennae with shallow punctures. Prothorax with a whitish band posteriorly; mesothorax dull and punctured, the punctures slightly wider apart and larger posteriorly; scutellum with larger and less shallow punctures, depressed from the sides to the middle line; propodeum with the anterior area more or less strongly irregularly rugose. Legs with the apical joints of the tarsi usually clear testaceous, sometimes however entirely obscure; posterior tibiae with a white line beneath at the base, the posterior metatarsi also generally with a short basal streak, but this is sometimes absent. Basal segment of the abdomen with scattered punctures, second and following with very distinct though shallow puncturation; beneath shining, rather largely and shallowly punctured.

Female, very like the ♂, apart from sexual differences. The prothorax is similarly banded, and the posterior legs are marked in the same way; the tarsi are often without the white streak, their apical joints are generally pale, but sometimes dark. Apical segments of the abdomen generally with bright brown hairs, but sometimes these are of an obscure colour. Length, 8—11 mm.

Nesoprosopis fuscipennis, var. *obscuripes*, var. nov.

Tarsi all dark, and the wings, especially beneath, with a violet iridescence; pubescence of the apical segments of the abdomen of the ♀ usually darker than in typical examples.

HAB. Mountains of Oahu, both ranges. Mountains of West Maui, var. *obscuripes*.

OBS. This and most of the following species are remarkable for their great size, and the very evident puncturation of the abdomen. The examples taken on Maui appear to be always of the var. *obscuripes*; some of the Oahuan specimens are hardly separable from these, while others with shining fuscous wings without iridescence, and pale tarsi, have a distinct appearance.

(43) *Nesoprosopis caeruleipennis*, sp. nov.

Praecedenti simillima, pronoto postice albo-marginato, tarsis infuscatis, alis laete caeruleo-iridescentibus. Long. 8—11 mm.

Hardly differs in structure, so far as I can see, from the preceding, but the dark wings with light blue iridescence on both surfaces, give it a very distinct appearance. The pale markings are like those of *N. fuscipennis*, those on the legs are variable. The apical segments are clothed above and beneath with more or less obscurely-coloured pubescence, and the tarsi are dark.

HAB. Mountains of Molokai and Lanai, from two to four thousand feet. Many examples taken, and a variety of both ♂ and ♀ on Molokai with the abdomen more or less reddish.

(44) *Nesoprosopis pubescens*, sp. nov.

Praecedentibus simillima, abdomine magis pubescente, pronoto postice nigro, rarius albo-marginato, segmento secundo ventrali a basi magis elevato, saepe subtuberculato; alis fuscis; ♀ abdominis segmentis apicalibus pallide pubescentibus. Long. 8—11 mm. (Plate II. fig. 21—21 *c*.)

Prothorax generally black, sometimes with a much broken white band on the posterior margin or faint indications of such, very rarely the ♂ has an entire band. The legs are variable in colour, in some examples almost the whole of the posterior metatarsi are white. The wings in the ♀ are shining fuscous, generally also in the ♂, but in one of these they show a distinct blue iridescence. The prothorax in the ♀ appears never to have an entire pale band, its abdomen is decidedly more pubescent and rather more punctured than in the allied species, and the second ventral segment is more strongly raised from the base, having in some specimens a tuberculate form.

Hab. Mountains of Hawaii from 2000—4000 ft. in various localities (Kona, Puna, and Kau). Not rare.

(45) *Nesoprosopis setosifrons*, sp. nov.

Nigra, alis fuscis caeruleo-iridescentibus; clypeo breviter nigro-setoso; scutello vix depresso, aequaliter punctato; ♂ pronoto nigro, nonnunquam postice albo-lineato, antennarum articulo primo nigro atque dilatato, evidenter longiore quam latiore; capite prae antennis utrinque, nonnunquam etiam clypeo, albo-maculato; tibiis posticis albo-lineatis; ♀ segmentis abdominis apicalibus pilis nigricantibus vestitis. Long. 7·5—10·5 mm. (Plate II. fig. 22—22 *c*.)

Male, with a large white spot on each side of the face below the antennae, and sometimes one near the apex of the clypeus; the hind margin of the prothorax rarely with a white band; posterior and intermediate tibiae with a pale line from the base, of variable length, sometimes reaching to their apex; basal joint of the tarsi with a spot at their base; sometimes however the legs are entirely dark, except the front of the anterior tibiae. Scape of the antennae black, without a white line on its front margin, dilated, its hind margin strongly rounded, its front one very slightly so, considerably longer than wide; clypeus with short erect black hairs (easily seen in lateral view); the face not deeply grooved at the sides along the eyes, above the antennae clothed with black hairs. Mesothorax and scutellum with dark pubescence, and shallowly punctured, the latter not depressed from the sides to the middle line; anterior area of the propodeum rugose, more strongly so in some examples than in others. Abdomen subelongate, evidently, but very shallowly, punctured; apical segments with dark pubescence; eighth ventral segment with the process dilated for about half its length, the dilatation of triangular shape, fringed on the ventral edge with long hairs, as also the terminal bifurcation.

Female, like the ♂ in general sculpture, but more robust. Face rather strongly convex longitudinally; clypeus with black bristly hairs. Prothorax always with a white margin; all the tibiae above white, or with a white line, beneath dark, except at the base; basal joint of the posterior tarsi with a white line. Abdomen shining with shallow and by no means close puncturation; second and third segments at the sides without indications of pale pubescence; apical segments with black hairs. Wings in both sexes entirely dusky, with steely-blue iridescence.

Hab. Mountains of Hawaii (4000 ft.). Kona district and at Kilauea. The ♂ is easily known from any of the preceding large species by the form of the scape of the antennae, which is less strongly arched beneath, and the less strongly dilated process of the eighth ventral segment, while the black-haired clypeus, the steely iridescence of the wings, and the less pubescent and less punctured abdomen, will distinguish either sex. Generally taken from flowers of *Metrosiderus*, *Rubus*, and sandal trees, and from burrows in the trunks of the latter. The single ♂ taken in Kona is the only one with the white-bordered prothorax, and it also has a large white spot on the clypeus. The ♀♀ taken there do not differ from the Kilauea specimens. The latter sex appears to be much more constant in colour than the former.

(46) *Nesoprosopis perspicua*, sp. nov.

Praecedenti affinis, pronoto latissime albo-fasciato, tibiis posticis (macula nigra apicali excepta) albidis; alis peropacis, nigricantibus; clypeo minus pubescente; ♂ capite toto nigro, antennarum articulo basali antice albo-marginato, bene distinguenda. Long. 8—9·5 mm. (Plate II. fig. 5.)

Closely allied to the preceding, but easily distinguished by the very wide creamy-white collar, and the posterior tibiae almost entirely of the same colour, being black only at the apex within. The wings are very dark, with steely iridescence. The posterior metatarsi are black, sometimes with a small white spot at the base. The ♂ has the face entirely black, but the anterior margin of the scape of the antennae is white. The eighth ventral segment is dilated much as in the preceding species. In both sexes the thorax is clothed with short inconspicuous pale pubescence, while in *N. setosifrons* it is longer and black.

Hab. Mountains of Kauai about 3000 ft. (January, 1897). A nice series were taken all from the flowers of a single tree (a species of *Straussia*), but only one of these was a ♂.

(47) *Nesoprosopis satelles*

Prosopis satelles, Blackburn, P. Manch. Soc. xxv. (1885–86), p. 141.

(Plate II. fig. 23—23*d*.)

Male, with the face entirely black, or with the clypeus tinged with red, or brightly red, as also sometimes the plate above it; scape of the antennae entirely black or with the anterior margin red. The face is wide across the eyes, and its sides along their borders deeply depressed, the depressions extending behind the line of insertion of the antennae. Scape of the antennae greatly dilated, not longer than wide, distinctly and very closely and finely punctured, both front and hind margins strongly rounded, beneath deeply arcuate. Mesothorax and scutellum with dark pubescence, distinctly and evenly punctured; propodeum with the anterior area more or less rugose in front, behind these rugosities its surface merely rugulose, sometimes the whole area rugulose. Abdomen subelongate, with a fine and shallow, but quite distinct puncturation, even on the basal segment; eighth ventral segment with its process exceedingly strongly dilated, the dilated part with a pale membranous appearance, its ventral crest densely clothed with generally sooty-black hairs, the extremity bifurcate and greatly dilated, fringed with long pubescence. Posterior tarsi sometimes testaceous, sometimes dark.

Female very like the ♂, but more robust, the clypeus and sometimes the plate above it and the scape of the antennae (more or less) red. Face strongly convex longitudinally, above the antennae generally finely strigose and punctured, clothed with dark pubescence. Prothorax black, as in the ♂, and the mesothorax and scutellum similarly punctured; propodeum with the rugosity of its anterior area extremely short, sometimes almost absent, the surface finely rugulose. Abdomen with the basal segments shining, the first distinctly, though finely and shallowly punctured, somewhat closely towards the apex; second segment very finely punctured on the basal half; the following segments with rather larger, but very shallow puncturation; apical segments with black hairs. Wings entirely dark in both sexes, and with blue iridescence. Length, 8—10 mm.

Hab. Mountains of Molokai and Lanai, and on Haleakala, Maui (5000 ft.). The males from Molokai generally have the face entirely black, or with the clypeus only obscurely reddish towards the apex. On Lanai they apparently always have the clypeus and anterior margin of the scape of the antennae pale. Two examples from Molokai resemble those from Lanai. Specimens from the latter island are of smaller average size than those from the former. On Maui I have only taken the ♀.

(48) *Nesoprosopis insignis*, sp. nov.

Praecedenti finitima, ♂ articulo primo antennarum fortiter transverso marginibus ambobus fortissime rotundatis; ♀ clypeo nigro distinguenda. Long. 8—9·5 mm. (Plate II. fig. 24.)

Like the preceding in general form and sculpture, but the ♂ with the scape still more strongly dilated, it being strongly transverse, both front and hind margin exceedingly strongly rounded. The facial markings are evidently variable, one of the two examples taken having the face entirely black, the other with a broad longitudinal yellow band, expanded at the apex, down the middle of the clypeus. In one the sides of the face are very deeply grooved, in the other much less so. Thorax and abdomen much as in *N. satelles*.

Female, face entirely black. Scutellum very dull, and very shallowly punctured; anterior area of the propodeum more rugose than that of *satelles*. Apical segments of the abdomen with a very faint aeneous tint in some lights, and clothed with dark pubescence. Wings dark, with blue iridescence.

Hab. Kilauea, Hawaii (4000 ft.). Two pair were taken, but neither in very good condition. When fresh, the ♀ probably has fairly distinct apical pubescent bands on the basal segments.

(49) *Nesoprosopis andrenoides*, sp. nov.

♀ praecedentis forma; propodei area antica clathrate-rugosa; abdomine laevissimo, subtilissime sparsim punctato, aeneo-micante, segmentis tribus basalibus postice pulchre albido-fasciatis (fascia prima interrupta), bene distincta. Long. 9·5—10 mm. (Plate II. fig. 6.)

Female, black, very like the preceding in shape. Mesothorax and scutellum quite dull, and distinctly punctured; anterior area of the propodeum entirely clathrately-rugose. Abdomen with the surface very smooth, sparsely and very finely punctured, black with a distinct aeneous or bluish tint; the first, second and third segments with beautiful fasciae of pale decumbent hairs on their apical margins, the first widely interrupted, apical segments with black hairs, beneath finely but distinctly punctured. Legs black (except that the anterior tibiae in front are sometimes more or less pale), with black pubescence. Wings dark, with blue iridescence.

Hab. Mountains of Kauai (2000—3000 ft.). Four females of this beautiful species were taken from the flowers of *Metrosiderus*.

(50) *Nesoprosopis paradoxica*, sp. nov.

Grandis et robusta, nigra, griseo-pubescens, propodeo antice rugoso, abdomine rufo (♀ rufo-nigro), distincte punctato; alis fuscis, supra aeneo-micantibus, subtus caeruleo-iridescentibus; ♂ antennarum articulo primo fortiter dilatato, sed haud latiore quam longiore, margine antico saepe plus minusve pallido, subtus fortiter arcuato; clypeo depresso; abdomine supra nigro-pubescente. Long. 9·5—11·5 mm. (Plate II. fig. 7, also fig. 25 and 25 *a*.)

Male, with the face entirely black, scape of the antennae sometimes with a pale line in front. The face is not deeply depressed at the sides, but the depression extends over the greater part of the clypeus; the scape of the antennae dilated, not much less wide than long, clothed with long pale hairs, its front and hind margins both rounded, beneath deeply arched. Thorax and scutellum with grey pubescence, and distinctly punctured, the latter depressed from the sides to the middle line; propodeum rugose in front. Abdomen red, with the basal segments shining, distinctly punctured, and clothed rather densely, especially on the third and following segments, with short black hairs; eighth ventral segment with the apical portion of its process hardly dilated, the terminal bifurcation fringed with dense long hairs.

Female, like the ♂, but more robust; face not very strongly convex longitudinally; scutellum dull, closely and evenly punctured; anterior area of the propodeum irregularly rugose. Abdomen shining, distinctly punctured, the basal segment red, more or less obscured, the rest reddish-black; second ventral segment simple, somewhat strongly and evenly punctured, the following segments more closely, the apical ones clothed with black hairs.

Wings in both sexes fuscous with blue iridescence beneath, and a bronzy glitter above.

HAB. Kona, Hawaii (4000 ft.). Not common. Taken while entering burrows in dead trunks of *Sophora*. It is an industrial species, though the ferruginous abdomen reminds one of most of the parasitic forms. This colour and the great size distinguish it at a glance from all but the following species.

(51) *Nesoprosopis erythrodemas*, sp. nov.

♀ praecedenti simillima, nigra, abdomine toto rufo; capite longitudinaliter magis convexo; propodeo, a fronte viso, acutius postice rotundato, sparsim longitudinaliter rugoso; abdominis segmento secundo ventrali minus nitido, subtilius punctato, et a basi fortiter elevato, distinguenda. Long. 10 mm.

Female, very like the preceding, but somewhat less robust; the face strongly convex longitudinally; the propodeum seen from in front sharply rounded behind, bearing a few longitudinal wrinkles. Abdomen entirely red, with the second segment more sparsely punctured above, beneath very strongly raised from the base to near the apex, and less shining and more finely punctured than that of *paradoxica*.

HAB. Kilauea, Hawaii (4000 ft.). Very rare, a single ♀ only taken, but had I supposed it to be distinct from the preceding at the time of capture, others probably might have been found.

(52) *Nesoprosopis anomala*, sp. nov.

♀ minor, capite, oculis exceptis, rubro; pronoto postice albido-marginato; mesonoto densissime punctato, pubescentia pallida vestito; propodei area antica glabra, subnitida, clathrate-rugosa, lateribus et parte posteriore dense pubescentibus; abdomine ad basim rubro, postice rufo-nigro, distincte punctato; tibiis rufis, supra albo-lineatis. Long. 7·5 mm.

Female robust, but not very large; head entirely red except the eyes, closely and rugosely punctured above the antennae, the pubescence pale. Thorax black, prothorax with a whitish posterior margin; tegulae testaceous with a yellow spot; mesothorax excessively densely and shallowly punctured, the disc glabrous, but all the margins clothed with pale fulvous pubescence, as also the whole of the scutellum, postscutellum, and propodeum, except the anterior area of the latter, which is quite hairless, and rather strongly clathrately-rugose and shining. Abdomen shining, the base red, the rest blackish, but more or less tinged with red; second and following segments distinctly punctured, apical segments with black hairs. All the legs red, the tibiae with a yellow line above: wings fuscous with very little iridescence.

HAB. Mountains near Honolulu. A single ♀ taken on the blossoms of *Acacia koa.* Allied to *N. setosifrons* and *perspicua,* this remarkable species in general appearance is quite unlike any other.

ACUTILINGUES.

APIDAE.

(1) *Xylocopa aeneipennis.*

Xylocopa aeneipennis, de Geer, Mémoires, III. p. 573, tab. 28, fig. 8. Smith, J. Linn. Soc. XIV. p. 684.

HAB. Abundant on the lowlands, but not found far up the mountains.

(1) *Megachile diligens.*

Megachile diligens, Smith, l. c. supra.

HAB. Oahu, Molokai, Kona district of Hawaii; not in the mountains. Rare. Blackburn says 'not uncommon,' and I suspect the species is rarer now than it was twenty years ago. It may be an endemic species, while the two following are certainly introduced, and are now abundant on most of the islands. Had they occurred in the islands formerly, Mr Blackburn would certainly have met with them, as they are common around the houses in Honolulu. I have not identified either from elsewhere, and do not know whence they were imported.

(2) *Megachile schauinslandi.*

Megachile schauinslandi, Alfken, Ent. Nachr. XXIV. (1898), p. 340.

Niger, thorace abdominisque segmento primo pubescentia fulva breviter denseque vestitis, segmentis caeteris utrinque macula pubescente albida ornatis, alis infuscatis, caeruleo-iridescentibus, scopa ♀ pallida. Long. 9—11·5 mm.

Black, the thorax and basal segment of the abdomen densely clothed with short fulvous pubescence.

Male: clypeus fringed with long pale hairs in front, otherwise shining, coarsely and closely punctured, and sparsely clothed with erect black hairs. Head above the clypeus with pale hairs, becoming fulvous about the insertion of the antennae. Thorax with short dense fulvous hairs, becoming longer at the sides of the propodeum. Anterior tarsi simple, the basal joint three or four times as long as wide. Wings and nervures fulvescent at the base, deeply infuscate over more than the apical half, and with a blue iridescence. Abdomen somewhat shining, coarsely punctured, the puncturation becoming less distinct on the apical segments, basal segment densely clothed with fulvous hairs, the following with inconspicuous black ones, and each with a small spot of white pubescence on either side along the apical margin, the second and third deeply impressed at the base, sixth with its apical crest slightly emarginate, and deeply foveolated before the crest. Ventral segments very densely punctured, clothed with appressed white pubescence, and each of the four visible ones with an entire apical fascia of longer and denser appressed hairs.

Female like the ♂ in general appearance but larger, the clypeus without the pale fringe and its puncturation excessively dense. Mandibles dull, rugose and punctured, flattened in front. Ventral scopa of silvery hairs, those on the apical segment black.

Hab. Several and probably all of the islands in and around settlements, often making its *nidus* in holes in woodwork, keyholes, &c. Very abundant in Honolulu.

Obs. I have had this species described for some years under the name of *M. domesticum* in MSS. awaiting publication, and have given it away under this name.

(3) *Megachile palmarum*, sp. nov.

Niger, cinereo-pubescens, abdomine ♂ 4, ♀ 5, fasciis pubescentiae pallidae ornato, alis subhyalinis, segmento sexto ♂ profunde emarginato, scopa ventrali ♀ pallida. Long. 9—10 mm.

Male: face densely clothed with pale fulvous pubescence to above the insertion of the antennae, the vertex almost bare and very densely punctured. Thorax finely and very densely punctured, sparsely clothed with pale pubescence. Wings subhyaline. Front tarsi simple. Abdomen densely punctured, the first four segments with a narrow entire apical band of pale pubescence, sixth with the apical crest deeply emarginate, and having a spot of appressed pubescence before the crest; beneath with four segments exposed, the second and third with an entire apical band of pale pubescence, the apical margin of the fourth sinuate; 5th submembranous, with a semilunar impressed area, which is notched in the middle of its apical margin, and appears to be densely covered with minute asperities (under the microscope these apparent asperities are seen to consist in reality of peculiar short thick hairs with knobbed apices); 6th band-like and fragile, with a transverse line of remarkable hairs, which are flattened and curved, with their apices bent and acuminate; 8th very delicate, tongue-like, obtuse at the apex; genital armature with the *stipites* and *sagittae* of equal length, the latter connected by membrane to their apex, the former flattened, widening towards the apex, and there pointed, bent outwards, and set with a few extremely short hairs. Calcaria pale.

Female very like the ♂ in general appearance. The pubescence is cinereous with little or no fulvous tinge, that on the clypeus is sparse, so that the puncturation is exposed. The first five abdominal segments have a band of pale pubescence, beneath the scopa is formed of silvery hairs, those on the apical segment black.

HAB. Several and probably all the islands, especially about towns or settlements. Nests frequently in the leaves of coconut and other palms when they have been rolled up by the larva of a Pyralid.

(1) *Apis mellifica.*

Apis mellifica, Linn. Syst. Nat. ed. x. i. p. 576.

HAB. The hive bee is common throughout the islands, and is now found wild in many of the mountain forests, forming its nests in hollow trees.

HETEROGYNA.

(Formicidae.)

Par Aug. Forel.

(1). *Ponera kalakauae*, nov. spec.

☿. L. 2·8 à 3 mill. Rapprochée de la *P. coarctata*, mais les mandibules plus courtes, plus larges, à bord externe moins convexe, n'ont à la partie postérieure de leur bord terminal que de deux à quatre dents très obtuses, indistinctes, mais assez larges, au lieu des petites denticulations serrées de la *P. coarctata*. L'épistome est plus court, bien plus concave de chaque côté de son bord antérieur, à convexité centrale plus forte. Le 1^er^ article du funicule est plus grêle, long comme les trois suivants réunis (ces derniers très courts); chez la coarctata et congénères, il est plus court. Les yeux ont de 7 à 8 facettes et sont assez près du bord antérieur. Tête rectangulaire allongée, à côtés très faiblement convexes. Le sillon frontal atteint presque l'occiput. Le mésonotum, vu de dessus, est presque circulaire, à peu près aussi long que le pronotum. La face basale du métanotum, à peine plus longue que le mésonotum, aussi longue que la face déclive, est notablement plus large derrière que devant (ses deux côtés convergent très distinctement en avant); elle forme un angle subitement arrondi, mais approchant de l'angle droit, avec la face déclive qui est plane. Le pronotum est très convexe devant, mais le reste du dos du thorax est subdéprimé, presque plan, très faiblement biincisé aux sutures. L'écaille est épaisse comme chez l'*eduardi* (plus épaisse que chez la *trigona*, plus mince que chez la *coarctata*), mais bien plus basse, dépassant à peine le thorax et l'abdomen. Abdomen distinctement, mais modérément rétréci après le 1^er^ segment; le second plus large.

Luisante; ponctuation bien plus fine, moins dense et moins profonde que chez la *coarctata*. La pilosité et la pubescence sont aussi plus fines et plus espacées.

D'un brun jaunâtre sale, avec le front, l'occiput et l'abdomen (sauf le premier segment et l'extrémité) bruns. Le pronotum et le mésonotum sont plus foncés que le métanotum et l'écaille qui sont plutôt d'un jaune brunâtre, comme les pattes, les antennes et les mandibules; tarses jaunâtres.

♀. L. 3·5 mill. La suture entre le scutellum et le métanotum très profonde; ce dernier assez long, bien séparé par une incisure distincte du reste du thorax, sans que ses côtés convergent en avant; une courbe très arrondie entre les deux faces du métanotum. Ailes courtes, hyalines, dépassant à peine l'abdomen.

Pattes, antennes, mandibules, extrémité de l'abdomen d'un jaune brunâtre plus ou moins foncé; cuisses brunes au milieu. Epistome, scutellum, écaille et bord des segments abdominaux d'un brun rougeâtre; le reste d'un brun foncé. Du reste comme l'ouvrière.

La forme du thorax, les mandibules etc. me semblent justifier la fondation d'une espèce, malgré le dédale déjà si compliqué du groupe *coarctata* auquel cette forme appartient.

Hab. Lihue, Kauai, ☿; the winged ♀ taken in the town at Honolulu.

(2) *Ponera perkinsi*, nov. spec.

☿. Extrêmement semblable d'aspect à l'*opaciceps* type, mais les pattes et les antennes sont plus courtes, les articles du funicule sont plus larges et plus courts (les art. 3 et 4 deux fois plus larges que longs); les dents des mandibules sont encore plus larges et plus espacées, les yeux un peu plus petits, le thorax plus convexe et la sculpture un peu moins dense et moins mate.

Les scapes atteignent le bord occipital. L'angle métanotal est un peu plus arrondi, et tout le thorax un peu plus trapu (face basale du métanotum plus courte), l'écaille aussi moins haute.

Tout cet ensemble de différences la rapproche de la *P. coarctata*, dont elle diffère par sa taille bien plus robuste et plus large, sa tête à côtés convexes, ses yeux distincts.

D'après M. Perkins, cette espèce, répandue à l'intérieur de toutes les îles Hawaï, doit être la seule forme bien certainement locale de l'archipel. Je crois donc que, malgré ses affinités avec l'*opaciceps*, il vaut mieux en faire une espèce. Elle varie de couleur jusqu'au rougeâtre.

Un exemplaire de l'ouvrière a des yeux à facettes assez gros, sans être du reste notablement plus grand que les autres, ni différent à d'autres égards. C'est donc exactement le même cas que celui de la *Ponera eduardi* Forel, récoltée par moi dans la Province d'Oran; mais chez cette dernière les individus oculés sont distinctement plus grands.

♀. L. 3·7 mill. Ailes hyalines, courtes; nervures et tache marginale pâles. Face basale du métanotum courte, sans trace d'incisure à ses sutures, passant en avant aux autres pièces par les mêmes surfaces, mais abruptement tronquée derrière par la face déclive. Du reste comme l'ouvrière, avec les différences ordinaires du polymorphisme sexuel. D'un noir brunâtre; mandibules rouges; pattes et antennes d'un brun rougeâtre. Echancrure de l'abdomen faible.

♂. L. 3 mill. Tête presque carrée, à angles postérieurs arrondis. Les yeux occupent un peu plus de la moitié antérieure des côtés. Scapes un peu plus courtes que le 2^me^ art. des funicules. Face basale du métanotum extrêmement courte, face déclive en talus. Abdomen pas ou presque pas rétréci après le 1^er^ segment. Subopaque ou luisant; sculpture bien plus faible que chez les ♀ et ☿.

D'un brun noir, pattes, antennes et écaille d'un jaune brunâtre sale.

HAB. In the mountains on all the islands, generally from 2000—4000 ft.

(3) *Ponera gleadowii* Forel, *r. decipiens*, nov. st.

☿. Ressemble énormément à la *P. ragusai* Em. qui me semble aussi être une race de la *gleadowii*. La nouvelle forme a tout à fait la taille et la forme plus grêle et plus allongée de la *ragusai*, mais l'écaille de la *gleadowii i. sp.*, avec la face postérieure aussi haute que la face antérieure. Sa couleur est d'un jaune plus rougeâtre (plus ocreux chez la *gleadowii i. sp.*, brunâtre chez la *ragusai*), sa pubescence plus faible que chez la *ragusai*.

HAB. Kauai on the coast. Hindostan, typical form; Sicily, race *ragusai*.

(4) *Leptogenys falcigera* Roger, var. *insularis* Smith.

☿♂. La *L. insularis* Sm. n'est à mon avis qu'une variété de la *falcigera*.

HAB. Kauai, Oahu, and Maui. Ceylon and Madagascar, typical form.

(5) *Pheidole megacephala* Fab. ☿♂.

HAB. All the islands from the coast to an elevation of 3000 ft. Cosmopolitan.

(6) *Stenamma* (*Ischnomyrmex*) *longiceps* Smith.

HAB. Honolulu (Rothney). Australia.

(7) *Tetramorium guineense* Fab. ♀.

HAB. Oahu, Molokai, Hawaii, and probably the other islands. Cosmopolitan.

(8) *Solenopsis geminata* Fab., *r. rufa* Jerdon.

☿. Cette race est celle de l'Inde qui se distingue de la forme américaine par sa couleur toujours d'un jaune rougeâtre, sa forme un peu plus robuste, avec les ☿ moins extrêmes (surtout la tête des ☿ major moins énorme), enfin par la présence d'une dent plus ou moins distincte au bord antérieur du mésosternum.

HAB. Honolulu, Waianae, etc., abundant. Hindostan and Malaisia. [Typical form North America.]

(9) *Pogonomyrmex occidentalis* Cresson ☿ (de ma collection).

HAB. —?. North America.

(10) *Monomorium floricola* Jerdon ☿ ♀.

HAB. Oahu, Molokai, Lanai, Maui, and probably all the islands. Cosmopolitan.

(11) *Monomorium vastator* Smith ☿.

HAB. Honolulu. Cosmopolitan.

(12) *Monomorium minutum* Mayr, *v. liliuokalanii,* nov. st.

Diffère de la forme typique avant tout par les dents de son épistome beaucoup plus écartées (un peu moins seulement que les arêtes frontales) et plus fortes. Yeux un peu plus en avant (vers le tiers antérieur) de la tête. Pubescence légèrement plus courte et plus appliquée. Premier nœud du pédicule d'une idée plus longuement pétiolé et à nœud plutôt plus bas (plus haut chez la var. *madecassum*).

HAB. Honolulu. Southern Europe, typical form ; varieties in Africa, Madagascar, etc.

(13) *Cardiocondyla wroughtonii* Forel, *v. hawaïensis,* nov. st.

☿. Diffère du type par sa couleur entièrement d'un jaune clair, avec une tache d'un brun roussâtre, nuageuse, de chaque côté de l'abdomen. Les antennes sont un peu plus grêles, les épines un peu plus longues et la sculpture est un peu plus délicate. Les arêtes (bord postérieur) de l'épistome sont aussi latéralement un peu plus aiguës, là où elles rejoignent le bord antérieur.

HAB. Molokai. Hindostan, typical form.

(14) *Cardiocondyla nuda* Mayr, *v. minutior*, nov. var.

L. 1·7 mill. Second nœud du pédicule un peu plus large que long (au moins aussi long que large chez la forme typique). Sculpture plus forte et surtout le thorax plus mat que chez le type. Téte, thorax et pédicule plus ou moins d'un rouge brunâtre assez sombre. Cette variété, plus trapue que la forme typique, ressemble un peu en petit à la v. *mauritanica* Forel, mais elle est plus mate et a les épines plus longues.

HAB. Honolulu and on Molokai. Polynesia, typical form; varieties in Hindostan, Algeria, etc.

(15) *Tapinoma melanocephalum* Fab.

☿. (La forme typique américaine, pas l'*indicum.*)

HAB. Honolulu and Waianae, Oahu; also on Lanai and Molokai, and no doubt the other islands. Cosmopolitan.

(16) *Prenolepis longicornis* Latr.

HAB. Abundant all over the islands on the plains.

(17) *Prenolepis obscura* Mayr.

Blackburn and Cameron, P. Manch. Soc. xxv. (1885—86), p. 174.

HAB. Hawaiian Is. (Blackburn). Not obtained by Mr Perkins, and therefore not verified by M. Forel. Australia.

(18) *Prenolepis bourbonica* Forel, *r. hawaïensis*, nov. r.

☿♀♂. Plus massive que la forme typique de la Réunion, plus large et moins élancée. Yeux des ☿ un peu plus gros. Poils de la téte un peu plus longs. La pubescence est aussi moins abondante et les nuances de couleur plus différenciées (moins mélées). La ♀ est plus noire, l'ouvrière plus claire. Chez le ♂, dont les tarses sont jaunes, les valvules génitales extérieures ont une échancrure médiane encore plus forte et la dent plus longue que chez la forme typique. Les ailes sont plus enfumées que chez la r. *bengalensis*, dont les valvules génitales extérieures la distinguent du reste.

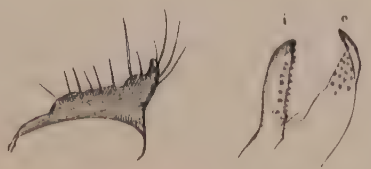
La forme du corps de cette forme, sa tête plus large derrière et devant (plus carrée) chez l'ouvrière m'engageraient à en faire une espèce, mais la structure des valvules génitales est trop voisine de celle de l'espèce typique.

Hab. Oahu, Molokai, and Hawaii; from the coast to 4000 ft. Réunion, typical form; a race in Hindostan.

(19) *Prenolepis sharpii*, nov. spec.

♀. L. 4·2 mill. Bien plus petite et plus grêle que la précédente. Tête assez fortement rétrécie devant, à côtés convexes. Ailes plus faiblement enfumées. Ecaille faiblement échancrée. D'un brun noirâtre, avec les mandibules, les scapes, les pattes, l'écaille et le scutellum d'un jaune sale ou légèrement brunâtre. Funicules brunâtres.

♂. L. 2·0 à 2·2 mill. Valvules génitales extérieures larges, très raccourcies, terminées d'un côté par une petite dent suivie de très près d'un feston (Fig. 1). Valvules moyennes pourvues de deux prolongements étroits, longs, faiblement courbés, presque égaux (l'externe un peu plus long) et fortement denticulés à leur moitié périférique et sur les faces qu'ils tournent l'un contre l'autre (les dents sont noires). L'interne est en outre coudé en dedans près de sa base (Fig. 1^a; *e*, prol. externe, *i*, prol. interne). D'un jaune à peine rougeâtre ou un peu brunâtre sur le mésonotum. Abdomen et dessus de la tête brunâtres.



1 1a

Valvules génitales mâles.

1, valvule extérieure: 1*a*, valvule moyenne; *i*, prolongement interne; *e*, prolongement externe.

☿. L. 2·3 mill. Abdomen brun; tête et thorax d'un brun jaunâtre. Pattes et scapes jaunâtres. Poils raides, assez épais, bruns. Tête ovale, assez étroite. Du reste presque impossible à distinguer de la *vividula*, tandis que les valvules génitales du ♂ sont absolument différentes.

Par ses valvules génitales cette espèce se rapproche surtout des espèces de l'Inde, comme *smythiesii* etc.

D'après M. Perkins, cette espèce a été récemment importée de Chine. Elle est en effet plus voisine des formes asiatiques que des formes américaines.

Hab. Honolulu, brought with plants from China.

(20) *Camponotus maculatus* F., r. *mitis* Sm., *v. hawaïensis*, nov. var.

Cette variété (♂, ♀ et ☿ minor) tient du *dulcis* et du *variegatus*. Les tibias sont un peu plus aplatis et plus prismatiques que chez ces deux variétés, les poils du corps un peu plus courts ; la pubescence est bien adjacente. Chez la ♀ le jaune de l'abdomen est disposé en taches plus ou moins distinctes ou confluentes.

Hab. In and around houses in Honolulu. A cosmopolitan species.

Si nous jetons un coup d'œil d'ensemble sur les 20 espèces trouvées jusqu'ici à Hawaï, nous y constatons d'abord l'absence des belles espèces caractéristiques de la Faune des îles Viti et Samoa décrites par Mayr (*Camponotus schmeltzi* etc.).

Quelques espèces absolument cosmopolites et évidemment apportées par les vaisseaux ne donnent aucun point de repère sur l'origine de la faune. Telles sont le *Tetramorium guineense*, la *Pheidole megacephala*, les *Monomorium floricola*, et *vastator*, la *Prenolepis longicornis* et le *Tapinoma melanocephalum*.

D'autres ont une grande étendue, mais caractérisent cependant la faune de l'ancien monde, spécialement la faune indo-malaise. Ainsi le *Solenopsis geminata r. rufa*, le *Leptogenys falcigera* (la var. *insularis* est hawaïenne il est vrai, mais à peine différente du type), le *Camponotus mitis maculatus* r.

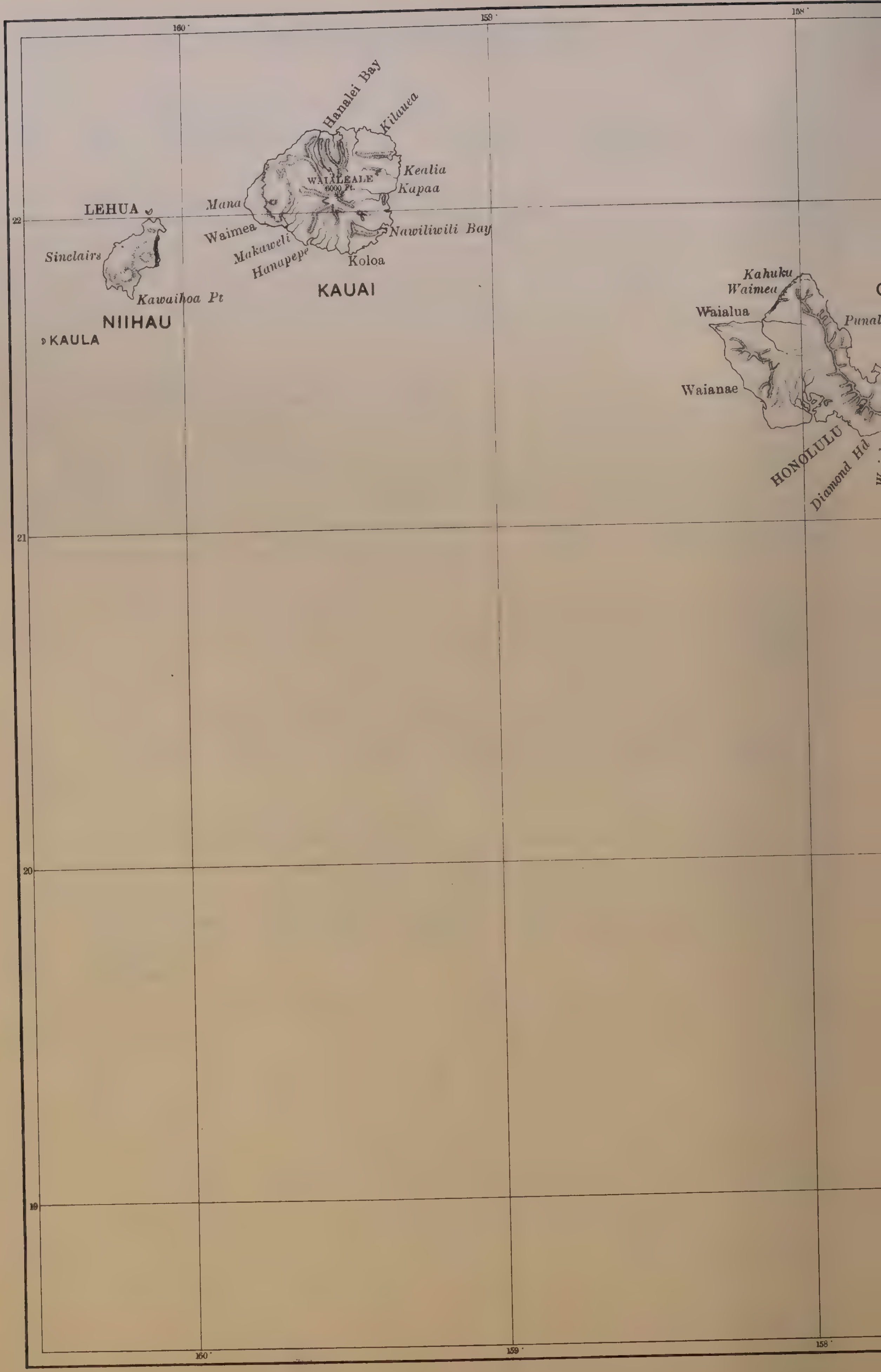
D'autres appartiennent à la même faune indo-malaise ou malgache, mais sont représentées aux îles Sandwich par des races ou variétés spéciales. Telles sont les deux *Cardiocondyla*, la *Ponera gleadowii r. decipiens* et la *Prenolepis bourbonica r. hawaïensis*.

Une autre race hawaïenne se rattache à une espèce de l'ancien monde : *Monomorium minutum r. liliuokalanii*.

Autres sont spéciales à Hawaï : *Ponera kalakauae* et *perkinsii ; Prenolepis sharpii*.

Une (*Pogonomyrmex occidentalis*) est de l'Amérique du nord (importée probablement, si l'étiquette est exacte). Une (*Stenamma longiceps*) provient de l'Australie (sans doute importée). La *Prenolepis obscura* me paraît fort douteuse ; peut-être est-ce la *bourbonica* ?

Somme toute, la faune locale paraît se rattacher à la faune indo-malaise surtout (sous-faune océanienne).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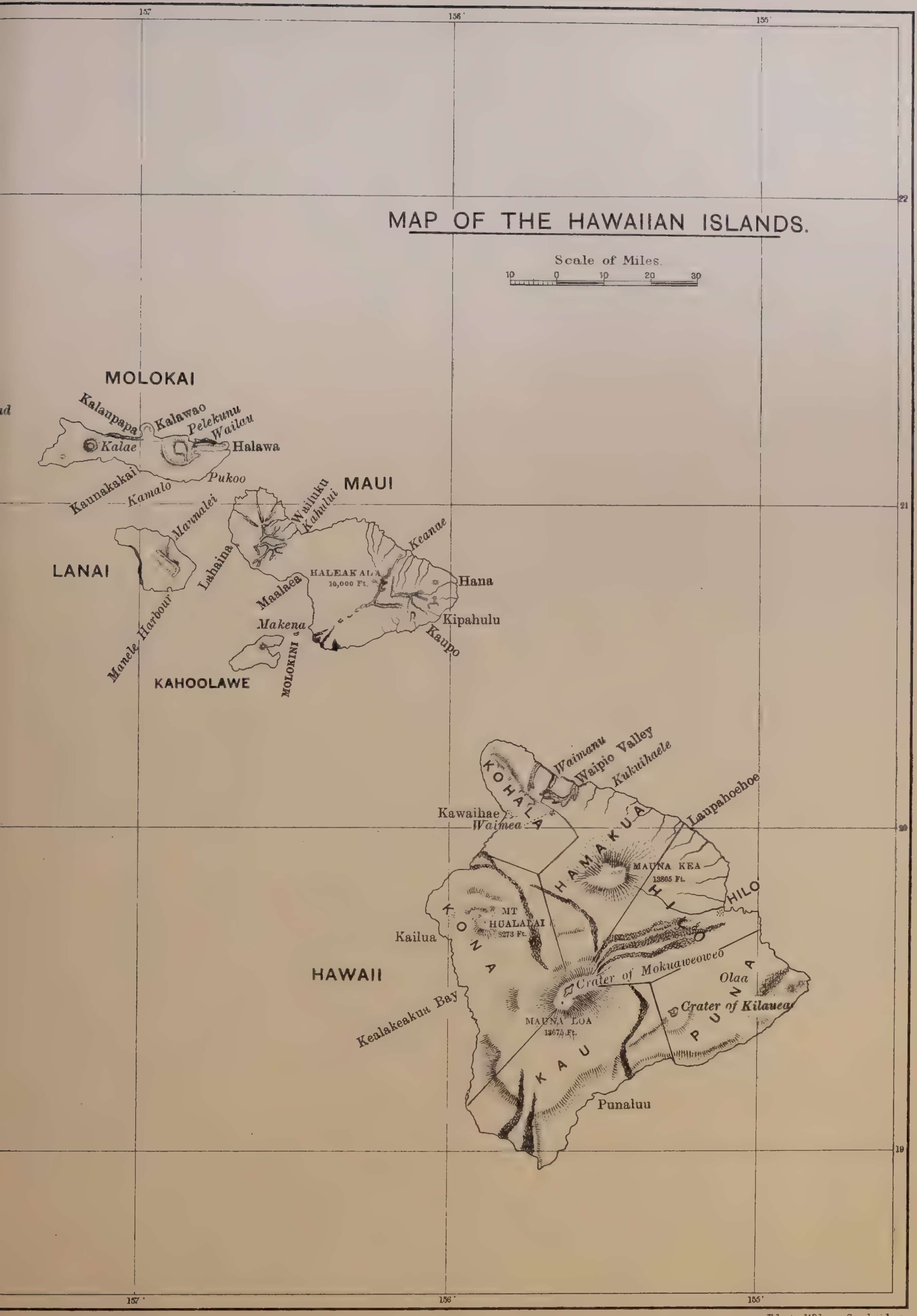


MAP OF THE HAWAIIAN ISLANDS.

Edwin Wilson. Cambridge.

DESCRIPTION OF PLATE I. (VOL. I.)

HYMENOPTERA ACULEATA.

Fig. 1. *Nesomimesa kauaiensis* ♀; 1 *a*, front view of head; 1 *b*, lateral view of head; 1 *c*, apical joint of tarsus.

Fig. 2. *N. nitida* ♀, head, front view; 2 *a*, lateral view of head.

Fig. 3. *Deinomimesa ferox* ♀; 3 *a*, clypeus, viewed from above; 3 *b*, basal segment of abdomen in lateral view.

Fig. 4. *D. cognata* ♀, basal segment of abdomen, dorsal view; 4 *a*, lateral view of the same; 4 *b*, clypeus, viewed from above.

Fig. 5. *D. hawaiiensis* ♂, basal segment of abdomen, dorsal view.

Fig. 6. *Crabro monticola* ♀; 6 *a*, antenna of ♂.

Fig. 7. *C. tumidoventris* ♀, abdomen showing strongly convex second ventral segment.

Fig. 8. *C. affinis* ♂, antenna.

Fig. 9. *C. curtipes* ♂, posterior tibia and tarsi.

Fig. 10. *Nesocrabro compactus* ♀.

Fig. 11. *N. rubrocaudatus* ♀; 11 *a*, front view of head.

Fig. 12. *Odynerus erro* ♀.

Fig. 13. *O. obscure-punctatus* ♀.

Fig. 14. *O. radula* ♀.

Fig. 15. *O. localis* ♀.

Fig. 16. *O. cyphotes* ♂, abdomen, lateral view.

Fig. 17. *O. orbus*, second ventral segment; 17 *a*, lateral view of the same.

Fig. 18. *O. kirbyi*, second ventral segment; 18 *a*, lateral view of the same; 18 *b*, posterior tibia of ♂, exterior surface.

Fig. 19. *O. dilatatipes* ♂, posterior tibia.

Fig. 20. *O. sociabilis* ♂, clypeus.

Fig. 21. *O. nubicola*, second ventral segment; 21 *a*, lateral view of the same.

Fig. 22. *O. ecostatus*, second ventral segment; 22 *a*, lateral view of the same.

Fig. 23. *O. camelinus*, second ventral segment; 23 *a*, lateral view of the same.

Fig. 24. *O. rudolphi*, second ventral segment; 24 *a*, lateral view of the same.

Fig. 25. *O. purpurifer*, second ventral segment; 25 *a*, lateral view of the same.

Fig. 26. *O. deinogaster*, second ventral segment; 26 *a*, lateral view of the same.

Fig. 27. *O. pseudochromus*, second ventral segment; 27 *a*, lateral view of the same.

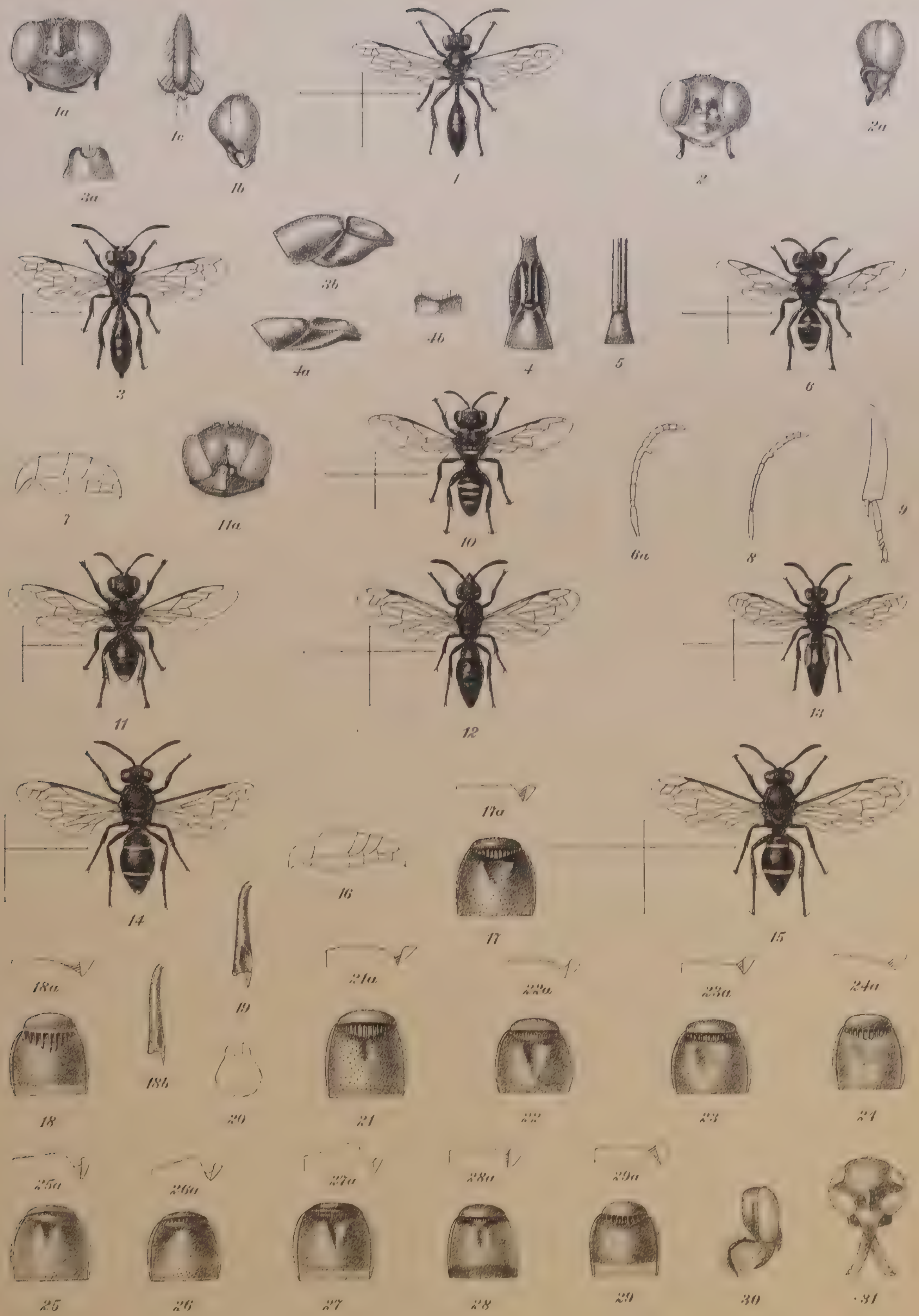
Fig. 28. *O. cyanopteryx*, second ventral segment; 28 *a*, lateral view of the same.

Fig. 29. *O. vittativentris*, second ventral segment; 29 *a*, lateral view of the same.

Fig. 30. *O. congruus* ♀, lateral view of head showing labial palpus.

Fig. 31. *O. chelifer* ♀, front view of head.

FAUNA HAWAIIENSIS. VOL. I. PLATE I



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Perkins, Hymenoptera Aculeata.

DESCRIPTION OF PLATE II. (VOL. I.)

HYMENOPTERA ACULEATA.

Fig. 1. *Nesoprosopis facilis* ♀.

Fig. 2. *N. crabronoides* ♀; 2 *a*, lateral view of head.

Fig. 3. *N. longiceps* ♂.

Fig. 4. *N. hostilis* ♀.

Fig. 5. *N. perspicua* ♀.

Fig. 6. *N. andrenoides* ♀.

Fig. 7. *N. paradoxica* ♂.

Fig. 8. *N. facilis* ♂, front view of head; 8*a*, scape of antenna; 8*b*, front view of the scape; 8*c*, 6th ventral segment; 8*d*, 7th ventral segment; 8 *e*, 8th ventral segment in surface view; 8*f*, the same in lateral view; 8*g*, apical view of termination of the process of the same; 8 *h*, genital armature.

Fig. 9. *N. simplex* ♂, genital armature.

Fig. 10. *N. hirsutula* ♂, face; 10 *a*, 7th ventral segment; 10 *b*, 8th ventral segment in lateral view; 10 *c*, apical view of the termination of the process of the same.

Fig. 11. *N. difficilis* ♂, scape of antenna, front view; 11 *a*, 8th ventral segment, lateral view; 11 *b*, apical view of termination of process of the same; 11 *c*, genital armature, typical of the genus.

Fig. 12. *N. volcanica* ♂, scape of antenna, front view; 12 *a*, 8th ventral segment, lateral view; 12 *b*, apical view of end of process of the same.

Fig. 13. *N. nivalis* ♂, face; 13 *a*, scape of antenna.

Fig. 14. *N. melanothrix* ♂, scape of antenna; 14 *a*, front view of the same; 14 *b*, 8th ventral segment, lateral view; 14 *c*, apical view of termination of process of the same.

Fig. 15. *N. laticeps* ♂, face; 15 *b* (the lower of the two figures so numbered), scape of antenna; 15 *b* (upper fig.), the same in front view.

Fig. 16. *N. blackburni* ♂, face; 16 *a*, scape of antenna; 16 *b*, the same viewed from in front; 16 *c*, 8th ventral segment, lateral view; 16 *d*, apical view of termination of process of the same.

Fig. 17. *N. anthracina* ♂, face; 17 *a*, scape of antenna; 17 *b*, the same viewed from in front; 17 *c*, 8th ventral segment, lateral view; 17 *d*, apical view of termination of process of the same.

Fig. 18. *N. flavifrons* ♂, scape of antenna; 18 *a*, process of 8th ventral segment, lateral view; 18 *b*, apical view of termination of process.

Fig. 19. *N. assimulans* ♂, face; 19 *a*, scape of antenna; 19 *b*, face of the var. oahuensis.

Fig. 20. *N. hostilis* ♂, 8th ventral segment, lateral view; 20 *a*, apical view of termination of process of the same; 20 *b*, anterior tibia and tarsus of ♀, showing form of leg of inquiline species; 20 *c*, anterior tibia and tarsus of industrial species (N. volcanica).

Fig. 21. *N. pubescens* ♂, scape of antenna; 21 *a*, front view of the same; 21 *b*, 8th ventral segment, lateral view; 21 *c*, apical view of termination of process of the same.

Fig. 22. *N. setosifrons* ♂, scape of antenna; 22 *a*, front view of the same; 22 *b*, 8th ventral segment, lateral view; 22 *c*, apical view of termination of its process.

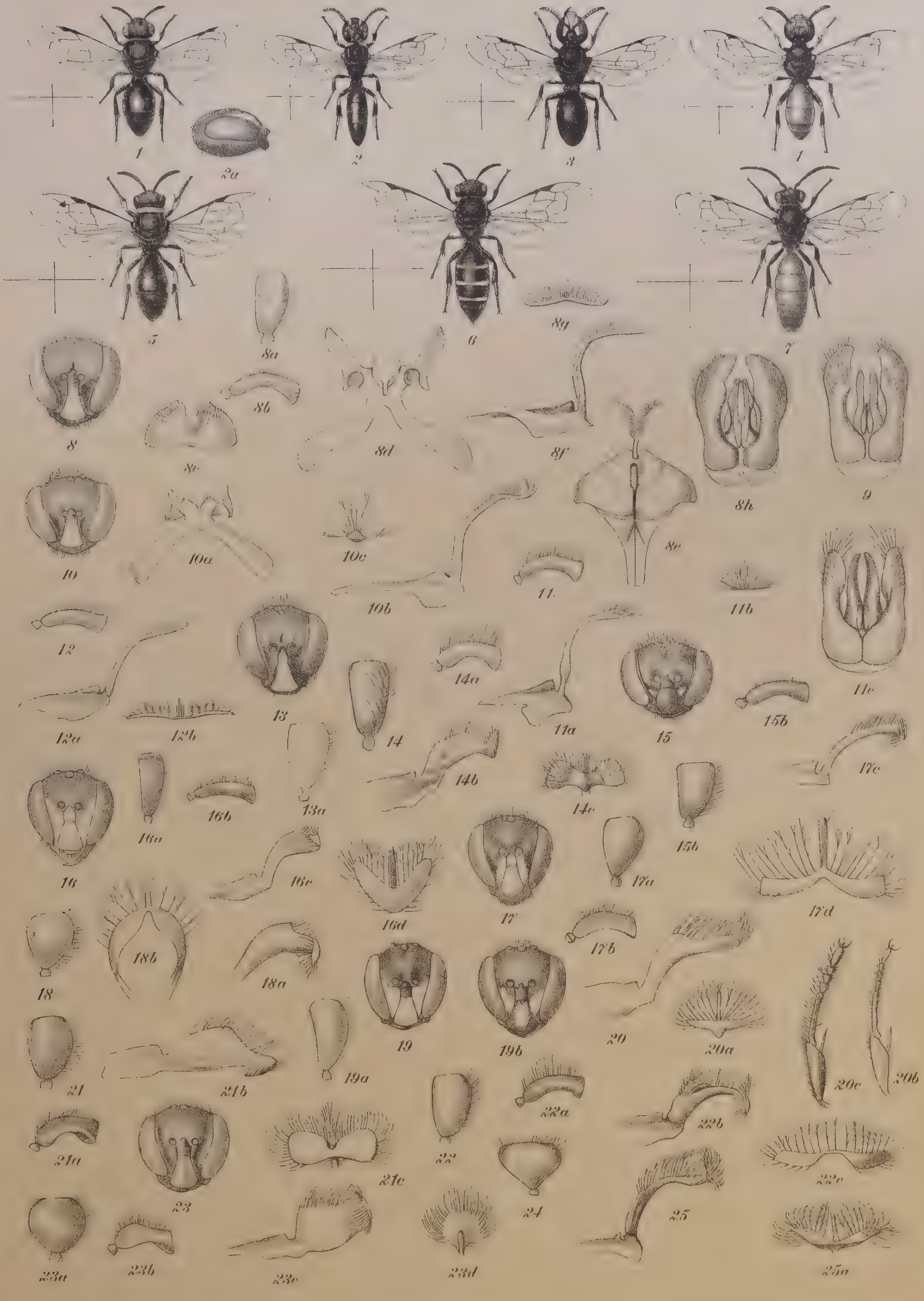
Fig. 23. *N. satelles* ♂, face; 23 *a*, scape of antenna; 23 *b*, front view of the same; 23 *c*, 8th ventral segment, lateral view; 23 *d*, apical view of termination of process of the same.

Fig. 24. *N. insignis* ♂, scape of antenna.

Fig. 25. *N. paradoxica* ♂, 8th ventral segment, lateral view; 25 *a*, apical view of termination of process of the same.

FAUNA HAWAIIENSIS

VOL. I. PLATE I.



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Perkins, Hymenoptera Aculeata.

FAUNA HAWAIIENSIS

VOL. I. PART II.

MACROLEPIDOPTERA

E. Meyrick.

Price Thirty Shillings.
To Subscribers Fifteen Shillings.

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Contributions have been made or promised by the following, viz.

F. E. Beddard, F.R.S.	*Earthworms.*
Prof. Auguste Forel	*Formicidae.*
Dr L. O. Howard and W. H. Ashmead	*Hymenoptera Parasitica.*
G. W. Kirkaldy, F.E.S.	*Hemiptera.*
Sir John Lubbock, F.R.S.	*Thysanura* and *Collembola.*
E. Meyrick, F.Z.S.	*Macrolepidoptera.*
R. C. L. Perkins, B.A.	*Hymenoptera Aculeata*, *Orthoptera*, *Neuroptera*, and part of *Coleoptera.*
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Mynheer F. M. van der Wulp ...	*Diptera.*

It is also intended to give a list of the Vertebrates, with their distribution, in the Islands.

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FAUNA HAWAIIENSIS

OR THE

ZOOLOGY OF THE SANDWICH (HAWAIIAN) ISLES:

Being Results of the Explorations instituted by the Joint Committee
appointed by

THE ROYAL SOCIETY OF LONDON FOR PROMOTING NATURAL KNOWLEDGE

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EDITED BY

DAVID SHARP, M.B., M.A., F.R.S.

SECRETARY OF THE COMMITTEE.

VOLUME I. PART II.

MACROLEPIDOPTERA

By E. MEYRICK, B.A.

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MACROLEPIDOPTERA

By E. MEYRICK, B.A.

MACROLEPIDOPTERA.

By Edward Meyrick, B.A., F.Z.S., F.E.S.

In this paper are included all the Lepidoptera except the Pterophoridae, Tortricina, and Tineina, which have been entrusted to Lord Walsingham. I propose to give a complete enumeration of all the species hitherto observed in the Hawaiian islands, describing the very numerous new species, and also redescribing those species of which our former imperfect knowledge has been enlarged by the acquisition of new material; and also to discuss some general considerations arising from the study of these forms.

I have not thought it necessary to quote the synonymy of the species, or to give references, except in so far as these have actual relation to the Hawaiian Islands. The accurate record of localities is in the case of this fauna so important for purposes of comprehension, that I have thought it best to particularise the number of specimens obtained from each locality, so as to indicate the value of the available evidence. On the other hand, the season of capture seems to depend in most cases only on the presence of the collector, and the impression derived from the records is that many species are probably obtainable throughout the year.

§ 1. General considerations on the Macrolepidoptera.

In the following enumeration 292 species are recorded, of which number exactly 200 are now described for the first time; these are assigned to 49 genera, of which 6 are new.

Relation of Genera and Species.

Of the 292 species, 31 occur also in other regions, the remaining 261 (or 89 per cent.) are endemic. Future discoveries are more likely to increase this percentage than to diminish it.

Of the 49 genera, only 10 (or 20 per cent.) are endemic, the other 39 occur elsewhere. The endemicity of the species is therefore four and a half times as great as that of the genera. It appears to me that this ratio, in the case of a highly endemic fauna, is an index of the same significance as is the proportion of species to genera in a highly apodemic fauna. If, as an example of the latter, we take the Lepidopterous fauna of the British Isles, as enumerated in my Handbook of British Lepidoptera, we find 2061 species and 458 genera, the ratio being 4½ to 1 exactly. I interpret this index as a measure of the comparative periods of time required to produce specific and generic characters, signifying with considerable precision (for I find the same result in such other faunas as are available for calculation) that on an average it takes four and a half times as long to produce a genus as to produce a species.

In the Hawaiian fauna, however, the proportion of species to genera is unusually high, being 6 to 1, and it may be asked why this is so. It appears probable that, owing to the extremely limited character of the fauna, and the relatively very small number of genera available in the first instance as a base of development, the generic competition has not been sufficiently severe to promote a high rate of modification: whilst the variety of situations presented under similar but slightly different conditions (such as those depending on altitude, rainfall, and insular separation), is highly favourable for specific development. I shall show presently that even the existing endemic genera are not all on the same footing.

Comparison of Families with other Regions.

Only 12 families are represented in this portion of the fauna, and two of these, the Galleriadae and Pyralididae, only by species of undoubtedly artificial introduction; thus only 10 are truly native, all of them being of world-wide distribution. In the corresponding portion of the British fauna there are no less than 34 families; yet all those families which are represented in Britain by more than 12 species are present in the Hawaiian Islands except the Arctiadae, Sterrhidae, and Notodontidae, and none which are represented by less; so that, except for those three families, the results are in accordance with the law of chance. The New Zealand fauna so much resembles the Hawaiian in its broad outlines that it may be worth while to compare them in tabular form.

	New Zealand.	*Hawaiian Islands.*
Arctiadae	4	0
Hypsidae	1	0
Caradrinidae	59	38
Plusiadae	7	13
Hydriomenidae	93	17
Sterrhidae	1	0
Orthostixidae	2	0
Monocteniadae	4	0
Selidosemidae	25	33
Sphingidae	1	7
Nymphalidae	6	5
Satyridae	4	0
Lycaenidae	4	2
Pieridae	1 (?)	0
Phycitidae	3	7
Galleriadae	1	1
Crambidae	49	8
Pyraustidae	76	159

	New Zealand.	*Hawaiian Islands.*
Pyralididae	2	2
Psychidae	2	0
Hepialidae	9	0

All the Hawaiian families are therefore found in New Zealand, the Galleriadae and Pyralididae being introduced in both alike, and 8 other families are also represented there, but only by a very few species, amounting altogether to 8 per cent. of the total, or an average of 1 per cent. each, whilst the ten other native families average over 9 per cent. each. The single species of Sterrhidae is an abundant Australian insect, and not improbably artificially introduced thence; the small size and weak flight of members of this family may account for their not crossing wide seas. The Notodontidae are absent from both faunas; they are notoriously seldom seen on the wing, and may therefore be habitually incapable of prolonged flight.

Geographical Distribution of Genera and Species.

For the consideration of this subject I shall group the genera not by their mutual affinities but by their constitution, as follows: (*a*) wholly[1] apodemic (none of these contains more than two species), (*b*) apodemic, with one endemic species, (*c*) apodemic, with from 2 to 6 endemic species, (*d*) apodemic, with from 9 to 13 endemic species, (*e*) apodemic, with 24 to 57 endemic species, (*f*) endemic, with 1 or 2 species, (*g*) endemic, with 14 to 30 species.

(*a*) *Apodemic genera, of one species, or of two species, neither endemic.*

There are 17 of this class, comprising 22 species.

Nine (*Plodia*, *Ephestia*, *Ephestiodes*, *Meliphora*, *Euchromius*, *Nymphula*, *Hymenia*, *Hellula*, *Pyralis*), with 11 species, have been artificially introduced by man, mostly as larvae feeding on preserved foods or cultivated plants, and are now apparently established as residents; all of them have similarly extended their range over most of the warmer regions of the globe (except *Ephestiodes*, which is hitherto only recorded from America), so that their place of origin is sometimes unknown, and is in any case unimportant for the present purpose.

Two (*Heliothis*, *Nomophila*), with 2 species, and also *Spodoptera exigua* and *Sphinx convolvuli*, are practically cosmopolitan, being found in suitable localities almost everywhere, and are further known to be possessed of very great powers of flight, having all been met with in the open sea, sometimes many hundreds of miles from the nearest land. These may have come in from any direction, though *Sphinx convolvuli* is considered to be the American form (*cingulata*).

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[1] *Endemic* denotes that a species or genus is apparently confined to these islands. I define *apodemic* as the opposite of endemic; it signifies that a form occurs outside the islands as well as in them.

Hypocala, Anosia, Plusia biloba, and *Sphinx celeus,* are American insects, all powerful flyers ; *Anosia* in particular has within recent memory extended its range over the whole Pacific to Australia and New Zealand.

Simplicia robustalis, Spodoptera mauritia, and *Plusia chalcites* are very wide-ranging species in S. Asia, the Malay Archipelago, and Australia, the two latter occurring also in Africa, and the last-named likewise in New Zealand and Europe ; the two latter are of powerful flight, but the *Simplicia* may prove, when its habits are made known, to be artificially introduced.

This class represents the effect of present-day influences. I think it probable that the 4 cosmopolitan species actually came from America, and in that case there would be a large preponderance of the American element. *Hypocala* has a well-marked local form besides the normal American type, and *Heliothis* also shows a tendency to form a local race, so that these two approach the character of the next class.

(*b*) *Apodemic Genera, with one endemic species.*

This class includes 7 genera and 12 species.

Caradrina is best omitted from consideration ; the single species (in one specimen) cannot be positively assigned to the genus, which is however widely distributed in the northern hemisphere.

Cosmophila is distributed throughout the tropical and subtropical regions of the world. It is represented by one apodemic species, which occurs also in Fiji, S. Asia, and Africa, but assumes here the character of a tolerably well-marked geographical race ; and one endemic species, which may reasonably be regarded as a development of the foregoing.

Hydriomena is a very large genus of universal distribution, but mainly characteristic of temperate regions. The single endemic species is not sufficiently near any other to allow of its affinity being positively stated ; but I am disposed to regard it as being of an Asiatic (Himalayan and Japanese) type.

Dasyuris consists, so far as is yet definitely known, of one Arctic species (Greenland, Labrador, Lapland), two Australian, and five from New Zealand. The Hawaiian species is not particularly close to any of these, though generally similar ; geographically it is an interesting link. The facts would seem to indicate a New Zealand origin.

Vanessa is represented by three apodemic species and one endemic. Of the apodemic, *V. cardui* is cosmopolitan, being perhaps the best traveller of all the Lepidoptera, and may have entered from any side ; *V. huntera* is American, *V. atalanta* European and American, but both have probably alike come from America. The endemic species is intermediate between *cardui* and *atalanta,* and its nearest ally is *V. callirrhoe* in the Canary Islands ; hence it is probable that both these are the insular descendants of a former wide-ranging American species, which was also the ancestor of the continental *cardui* and *atalanta.*

Lycaena exhibits one apodemic species, the very widely distributed *L. baetica*, which occurs in many Pacific islands, Australia, Asia, Africa, and Europe; and one endemic species, by no means very close to any other, but belonging to the group of *L. argiolus* (Europe and N. Asia).

Prionopteryx includes at present 7 American species, 2 African, and one Australian; the single Hawaiian species is sufficiently remote from any of these, but probabilities are much in favour of an American origin.

Summarising these, and excluding ambiguous forms, the apodemic species (present-day) show 2 Asiatic and 2 American; the endemic (earlier) indicate 2 Asiatic, 1 New Zealand, and 2 American species.

(*c*) *Apodemic genera, with 2—6 endemic species.*

These number 8 genera, with 29 species.

Hypenodes is a characteristically Indo-Malayan genus, though certain species range into Europe, Africa, Australia, and New Zealand. Of the five endemic species, one (much the commonest) is closely allied to the wide-ranging *H. costistrigalis*; the other four are presumably derivatives of this, but are in part rather curiously diverse, showing sufficient structural modification to permit of subgeneric separation if desired. The mutual relations of these species are however difficult to understand, and the genus presents many obscure problems.

Xanthorhoe is a very large and cosmopolitan genus, though relatively more prominent in New Zealand than elsewhere. The four endemic species are probably but not obviously of common origin; they are of an early type, and may have most affinity to some Australian and New Zealand forms, but it is uncertain.

Deilephila includes one apodemic and four endemic species, one of the latter being of doubtful generic reference and therefore best neglected for the present. The apodemic species is the cosmopolitan *D. lineata*, an insect of exceptionally powerful flight, which might have come from either side. The three other endemic species form a single group, doubtless from a common ancestor, rather markedly distinct from any other, but perhaps related most to *D. galii*, which is widely spread in Europe, C. Asia, and N. America.

Homoeosoma is a generally distributed genus. The two endemic species (extremely similar but structurally distinct) must be modifications of a single ancestor, and approach very closely *H. vagella*, which is very common in Australia, and scarce in New Zealand.

Talis includes at present 28 Australian species, 1 New Zealand, 4 Indo-Malayan, 2 African, 3 European, and 2 C. and S. American. The 6 Hawaiian species (probably there are more to be discovered) form a closely connected group of single origin, which seem to resemble most the small and inconspicuous Australian *T. gelastis*, though they show little similarity to the main body of Australian species. It is however also possible that the connection is with the Indo-Malayan forms. The distribution of this genus is curious, and it was perhaps once more generally prevalent.

Margaronia is universally distributed in tropical and subtropical regions, but is most characteristic of the Indo-Malayan fauna. The two endemic species (quite independent, and belonging to different groups of the genus) are both of Indo-Malayan affinity.

Mecyna is a limited but cosmopolitan genus. There are two endemic species, of which one is the local representative of the universally distributed *polygonalis* group, being apparently nearest to the New Zealand form, *M. deprivalis*; but here it certainly appears probable that the New Zealand representative is derived from the Hawaiian and not *vice versâ*, as it shows no immediate relationship to the Australian form. In this case the origin of the Hawaiian form must be referred to North America. The other species is of somewhat uncertain affinity, but may possibly be a derivative of the first.

Loxostege is characteristic of the northern hemisphere, though stragglers occur as far as Australia. The three endemic species form a connected group, not very near to any other, but possibly inclining rather to the North American type.

In this class, therefore, apart from one doubtful and one apodemic cosmopolitan form, 9 primary species are indicated, of which three are certainly Indo-Malayan, 3 probably American, and 3 probably Australian.

(*d*) *Apodemic genera, with* 9—13 *endemic species.*

In this class are comprised 4 genera, with 42 species.

Leucania is a large and quite cosmopolitan genus; some of the species are great wanderers, and many, perhaps most, of the species feed in the larval state on grasses, and therefore find suitable food everywhere; the genus is relatively prominent in New Zealand. The 9 Hawaiian species belong to two quite independent and dissimilar groups; the first 4 species form an endemic group which is rather strikingly distinct from anything known to me, and must be classed as of wholly unknown origin; the apodemic *L. unipuncta* is spread over sufficiently warm regions of the whole globe, and its original home is doubtful; whilst the remaining 4 endemic species form a connected group so closely approaching *L. unipuncta* that they must be held to have been derived from it.

Eucymatoge includes about 20 Australian, Asiatic, and European species. It is however also interesting as being the undoubted parent of the very extensive genus *Tephroclystis*, characteristic of the Northern hemisphere but more especially Europe, and the also considerable *Chloroclystis*, which is principally Indo-Malayan, Australian, and New Zealand. Hence it is relatively a rather old genus, which would seem to have been largely replaced throughout its range by its improved descendants. The 10 endemic Hawaiian species form a single group, probably of Asiatic origin.

Omiodes is a genus of moderate extent, spread over the tropical and subtropical regions of the whole globe. The 13 endemic species form one connected group, in which the characteristic elongation of the patagia is less marked than usual, and the type may therefore be regarded as comparatively early. Their origin would seem to be Asiatic.

Pyrausta is a very large genus, especially characteristic of the Northern hemisphere, though a certain number of species are found in the Southern. The 10 endemic species constitute a single group, but two of them show a certain structural modification which might be termed subgeneric. In their general character they so much resemble the species of the allied genus *Phlyctaenia*, that it seems fair to presume they are an early type, recalling the common ancestor of *Phlyctaenia* and *Pyrausta*; and as *Phlyctaenia* is characteristic of Europe and N. Asia, we may suppose that they are probably of Asiatic origin.

The features of this class, which must be of a considerable age, agree, so far as they can be deciphered, in pointing to a predominant Asiatic influence.

(*e*) *Apodemic genera, with* 24—57 *endemic species.*

These include 3 genera and 106 species.

Agrotis is a very large and dominant genus of world-wide distribution, but most largely developed in Northern temperate regions. Two apodemic species occur, *A. saucia* being common to Europe and N. America, and *A. ypsilon* ranging throughout the Northern hemisphere and extending into the Southern; the former must be reckoned American, the latter uncertain. Besides these there are 23 endemic species, not nearly related to the two already mentioned, but apparently all connected together; it is however difficult to affirm this, as change would seem to have taken place on much the same lines as in other regions, and there is great similarity between the species of different regions. The Hawaiian species as a whole certainly approach nearest to those of N. America, some of the forms being so close that at first I thought they might be identical; hence it seems very probable that their origin is American.

Phlyctaenia is a large genus, especially characteristic of Europe and N. Asia, but with a few species elsewhere. There are 24 endemic species, forming a connected group, whose origin must be esteemed undoubtedly Asiatic.

Scoparia includes, so far as known to me, about 30 European species, 12 Asiatic, 3 African, 3 Madeira, 6 St Helena, 8 N. American, 9 S. American, 24 Australian, and 65 New Zealand. To these must now be added no less than 57 Hawaiian, all endemic, and undoubtedly all belonging to a single group, presumably traceable to a single ancestral form. This multiplicity of species is considered by Mr Perkins to be partly due to the very great variety of suitable situations afforded, assuming, as is most probably the case, that the larval food consists of lichens. Probably a humid insular climate is particularly favourable to them, provided it is also sufficiently cool; the latter condition can be secured by increased altitude, but a low-lying tropical island would not be favourable. After making allowance for such local circumstances, however, there remains an excess of development of the genus in New Zealand and the Hawaiian Islands, which does not seem explicable merely by favourable conditions. Early occupation of the ground must have been the other factor in this result, and probably at something like the same period in both island-groups, and this would imply a common origin. Now the Hawaiian species are characterised by an unusual tendency to narrowness of forewings, and by generally showing a few long hairs in the cell of the hindwings; both which characters are also repeated in a section of the New Zealand species, and not in those of any other region. The New Zealand species as a whole display a much greater variety of size and facies than any others, and must be regarded as primitive in type and unspecialised. Two or three Australian species of similar character doubtless claim a New Zealand origin. The Patagonian *S. chordactis*, however, and one or two other species from neighbouring portions of South America, which are undoubtedly closely related to peculiar New Zealand types, are not so easily explained, but must be classed with the considerable body of other evidence showing an ancient interchange of fauna and flora between South America and New Zealand. An elevation of 1100 or 1200 fathoms in the bed of the South Pacific Ocean would be required, to allow of this being easily effected; it is a large demand, but cannot be said to be impossible. My present opinion, on the available evidence, is that *Scoparia* originated in the New Zealand region, probably at that time considerably extended. The Hawaiian Islands must then have received their original species from New Zealand direct, and I should suppose that Christmas Island must have been on the line of transmission, and would probably still possess allied species as evidence thereof.

These three genera are then respectively American, Asiatic, and New Zealand.

(*f*) *Endemic genera, with* 1 *or* 2 *species.*

A class comprising 7 genera and 9 species.

Nesamiptis contains two nearly related species; it is most allied to *Hypena*, which is extensive and very generally distributed, but apparently approaches especially the type of some North American species.

Progonostola is almost certainly an endemic derivative of *Xanthorhoe*.

Sisyrophyta is undoubtedly an offshoot of *Scotorythra*.

Tritocleis is at present of quite uncertain affinity, and must be neglected.

Genophantis is certainly nearest to the monotypic Australian *Crocydopora*, which also occurs in New Zealand. It therefore stands on quite the same footing as *Homoeosoma*.

Promylaea is clearly an offshoot of *Mestolobes*.

Protaulacistis is undoubtedly closely allied to *Orthomecyna*, but is in some respects more primitive, and may therefore be regarded as a collateral development.

Excluding the doubtful one, 4 of the above are therefore of native origin, 1 Australian, and 1 American.

(*g*) *Endemic genera, with* 14—30 *species.*

These number 3 genera and 72 species.

Scotorythra contains 30 species. It is distinguished from all genera of the Selidosemidae known to me (except its derivative *Sisyrophyta*) by the peculiar antennal character; in other respects it has a general alliance to the cosmopolitan genus *Selidosema*, but is of a somewhat more primitive type, and without the characteristic fovea. It is therefore probably earlier in origin than *Selidosema*, but I cannot indicate any nearer relationship with other genera.

Mestolobes includes 28 species, and *Orthomecyna* 14. They are collateral genera, obviously nearly allied together, yet with differences which imply that they were derived not one from the other, but from a common ancestor. They belong to the group of *Scoparia* and *Heliothela*, more especially approaching the latter and *Eclipsiodes*, but I consider that they cannot properly be regarded as derived from either of these, but rather from an earlier ancestral form. The monotypic Malayan *Dasyscopa* resembles them in the presence of a subdorsal hairy groove in the hindwings, but appears notwithstanding to be only an offshoot of *Scoparia*. *Heliothela* contains only a very few species, but is almost cosmopolitan, though with a leaning to the Southern hemisphere; *Eclipsiodes* is Australian.

The origin of the three large endemic genera is therefore unknown. But if, as inferred above, *Scoparia* originated in the South Pacific, there is presumptive evidence for supposing that the other genera collaterally derived from its parent form must have originated there too; and the distribution of *Heliothela* and *Eclipsiodes* rather tends to confirm this supposition. If this be granted, why should not *Scotorythra*, whose origin cannot be traced elsewhere, but may be presumed from its specific development to date from about the same period, be descended from an extinct form inhabiting the same region? For it must be clearly understood that these large endemic genera could not have originated in the Hawaiian Islands themselves, for want of possible ancestors; they must be derived from apodemic forms, but such as from competition of improved types, or other causes, have not survived elsewhere.

Arrangement of Genera in order of time.

From a consideration of the foregoing analysis we can now with considerable probability group the genera under successive periods of time, and indicate the nature of the geographical influences of each period, beginning with the most ancient.

First Period.

To this belong 7 genera, viz. *Sisyrophyta*, *Scotorythra* (Selidosemidae), and *Scoparia*, *Promylaea*, *Mestolobes*, *Orthomecyna*, *Protaulacistis* (Pyraustidae), with 133 species. Probably all these must be traced to a South Pacific origin, and the former existence of a considerable land-area (now submerged) between New Zealand and South America is postulated.

Second Period.

Here are referred 5 genera, viz. *Agrotis* (except 2 species), *Eucymatoge*, *Omiodes*, *Pyrausta*, and *Phlyctaenia*, with 80 species. Of these the first only is American in origin, the other four Asiatic. Possibly this period may coincide in time with the considerable extension of the Hawaiian Islands to the north-west which seems to have once existed.

Third Period.

This includes 18 genera and 48 species. Of the genera 6 are probably Australian or New Zealand in origin (*Dasyuris*, *Progonostola*, *Xanthorhoe*, *Homoeosoma*, *Genophantis*, *Talis*), 5 Asiatic (*Hypenodes*, *Cosmophila*, *Hydriomena*, *Lycaena*, *Margaronia*), and 5 North American (*Nesamiptis*, *Vanessa* (1 species), *Prionopteryx*, *Mecyna*, *Loxostege*), showing a nearly balanced equality of influence which implies circumstances much as at present. *Leucania* and *Deilephila* (4 species) are of doubtful import.

Fourth Period.

This is represented by 29 species, contained in 21 genera, viz. *Agrotis* (2 species), *Deilephila* (1 species), *Vanessa* (3 species), *Lycaena* (1 species), and the 17 genera recited above as wholly apodemic. Excluding 9 of these genera, which are presumably of artificial introduction, and 7 other species which are practically cosmopolitan, there remain only 11 species, of which 5 are certainly and 2 probably of American origin, and 4 presumably Asiatic. The preponderance of the American element (I think a majority of the cosmopolitan species probably also came from that side) seems to be explained by the fact that almost all these species possess great powers of flight, and find little obstacle in mere distance, but are by no means independent of the wind; this effect is therefore traceable to the influence of the N.E. Trade-winds.

It is to be observed that none of the genera of the first and second periods, except *Agrotis*, and only about half the genera of the third period can be esteemed strong on the wing; these must therefore in general have proceeded by way of intermediate islands. Moreover, nearly all the genera of decided American origin, in whatever period, possess this characteristic of strong flight, and as the trade-winds must always have existed, there seems no reason to suspect the previous existence of any intermediate islands between Hawaii and N. America.

Inter-Island Distribution of Species.

The following statistics relate only to the 261 endemic species. No doubt further exploration would extend the inter-island range of some species, but probably new species of restricted range would be discovered in an equal proportion, so that the general results may be taken as fairly representative.

Of 4 species taken by Mr Blackburn the localities have not been recorded; I suppose 3 to be from Maui and 1 from Oahu, but they are not included hereafter; the total may then be taken as 257.

Of these 173, or more than two-thirds (67 per cent.), are confined each to a single island. The whole number of species occurring in each island, the number of peculiar species, and the proportion between the two numbers, are given in the following table:

	Total number.	*Peculiar species.*	*Percentage.*
Hawaii	128	65	51
Maui	66	26	39
Lanai	32	5	16
Molokai	49	12	24
Oahu	51	17	33
Kauai	97	48	49

Of the remaining 84 species, 36 have been taken both in Hawaii and Kauai, at opposite ends of the group, and usually in one or more of the intermediate islands; they may therefore be counted as ranging throughout the group. The distribution of the others is as follows:

Hawaii, Maui	9
Hawaii, Maui, Lanai	1
Hawaii, Maui, Molokai	3
Hawaii, Lanai	4

Hawaii, Molokai	7
Hawaii, Oahu	3
Maui, Lanai	2
Maui, Lanai, Molokai, Kauai	1
Maui, Molokai	1
Maui, Molokai, Oahu	1
Maui, Molokai, Oahu, Kauai	1
Maui, Molokai, Kauai	1
Maui, Oahu, Kauai	1
Maui, Kauai	2
Lanai, Molokai	2
Lanai, Molokai, Oahu	1
Lanai, Oahu	1
Lanai, Oahu, Kauai	1
Molokai, Kauai	2
Oahu, Kauai	4

These figures do not seem to lead to very much. The high percentage of peculiar species in Hawaii and Kauai is apparently only what might be expected from their position at the extremities of the group, since interchange of species proceeds in their case on one side only, whilst in the intermediate islands it proceeds on both sides.

There are certain well-marked instances of representative species in the different islands. Thus in *Scoparia* there are six species (nos. 7—12) which are easily distinguishable from all the rest by the entire black subterminal fascia, yet also separated by well-marked characters from one another; five of these are confined respectively to the five islands Hawaii, Maui, Molokai, Oahu, and Kauai; the sixth is a Kauai species, but differs from all the other five in being yellow instead of white. *Scoparia halmaea* is the Kauai representative of *S. meristis*. *Orthomecyna alloptila*, *chrysophanes*, and *albicaudata* are mutually representative in Hawaii, Kauai, and Lanai respectively. *O. exigua*, which occurs in Hawaii, Maui, and Molokai, is represented in Lanai by *O. cupreipennis*, and in Kauai by *O. mesochasma*. *Scotorythra aruraea*, from Hawaii, is represented in Oahu by *O. caryopis*, in Kauai by *O. isospora*, and probably in Maui by *O. corticea*.

On the other hand there are some curious instances of allied species, which might have been expected to belong to different localities, but which are found occurring side by side. Such for example are the two species of *Sisyrophyta*, which are very similar except in the peculiar secondary sexual characters of the males, the females being superficially almost indistinguishable; both of these are common in the same localities in Hawaii, though it is true that one also occurs in Molokai. So also *Scoparia struthias*, *triacma*, and *cryerodes*, which are so similar that I took them at first for one variable species—perhaps I should add that there is really no doubt of their distinctness—all occur commonly together in the same locality, and are confined to the same island. *Omiodes demaratalis* and *monogramma* are another very closely related pair, inhabiting the same localities in Oahu and Kauai. It seems to me that possibly the comparative slackness of competition in the Hawaiian Islands may account for this coexistence of two or three similar related forms, of which under severer conditions one would probably have been improved up to the point of completely ousting the others, or perhaps the weaker would have been superseded by a species of a different group.

CHARACTERISTICS OF THE FAUNA.

(*a*) *Absence of primitive forms.*

There are no genera of very early type, such as would help to fill up gaps between previously known forms. The conditions might probably have been favourable for the preservation of such genera, if they had ever reached the islands, but they do not seem to have reached them. The genera of the first two periods designated above are early rather than late; they belong to the earlier half of the Lepidoptera, but that is all that can be said for them. Perhaps the islands, old as they must be geologically, are still not old enough for this.

(*b*) *Prevalent close relationship of species.*

In those genera where the species are numerous, they are also generally very difficult to understand. Had the specimens been without locality-labels, I do not think it would have been possible to have separated the species satisfactorily; but when arranged in geographical series, the differences, if any, became apparent. This state of things would seem to imply that the elimination of species has not been carried so far as in other regions where there is a sharper competition, which would have tended to increase the divergence, whilst at the same time destroying the intermediates. The climax of difficulty is reached in *Scotorythra*, where many of the species are also very variable, whilst the sexes often differ considerably and are hard to match, and the secondary sexual characters, which often afford a good distinction in the males, are not available in the females. It is of course essential that the sexes of these species should be able to recognise one another with ease, and the visible differences which exist are sometimes so slight or so little obvious that it hardly seems credible that they can be appreciated by the insects themselves; in such cases it would appear necessary to suppose that the sense of smell has to supply the deficiency. The expansible hair tufts on the genital organs of almost all Lepidoptera are probably scent-producing structures connected with this purpose. On the other hand, if the insects themselves do not appreciate slight visible differences, how are these differences preserved from loss? It seems difficult to imagine that the numerous white and black species of the *jucunda* group of *Scoparia*, which are no doubt well concealed by their colouring amongst the lichens, derive any advantage in this respect from the slight characters of marking in which they differ from one another; and if there were not some influence tending to the maintenance of these characters, variation in that particular would be unrestricted and they would disappear. In an ordinary fauna this difficulty does not usually present itself.

(*c*) *Tendency to variability.*

An unusual proportion of species show strong variability, which in perhaps 15 or more species becomes excessive. It is impossible to give precise figures on this point, that would be of any real value, as many of the species only exist in one or two specimens. The variation of such insects as *Hypenodes altivolans* and *Eucymatoge monticolans* is quite phenomenal, and the proportion of highly variable forms is certainly much larger than in an ordinary fauna. In New Zealand, however, highly variable species of the same character are found in perhaps much the same proportion. Such species seem to resemble nebulae, which time, or a modification of circumstances, will break up and condense into groups of stars. I conceive that species in this state of potential multiplication are more plentiful in thinly stocked regions, such as the Hawaiian Islands and New Zealand, because the number of unoccupied stations for species acts as an apparent incentive by removing a real check. In other words, species are being formed relatively much more frequently in such regions, and therefore these afford the most favourable opportunity for studying the process. In confirmation of this view, it may be noted that the 57 species of *Scoparia* are remarkably constant, not one being even moderately variable, on the available evidence; in this genus specific development has already proceeded so far that suitable stations (assuming restriction to a lichen-feeding habit) are probably almost all occupied.

(*d*) *Tendency to dull colouring.*

It might perhaps be expected that a group of tropical islands, enjoying abundant sunshine and possessed of a luxuriant vegetation, would be remarkable for the bright colouring of its Lepidoptera, but the case is quite the reverse. Considered as a whole, the general effect is exceptionally sombre. This is in some part attributable to the accidental constitution of the limited fauna, of which the principal genera are such as are usually inconspicuously coloured in all regions; thus *Agrotis* habitually assumes the obscure tints of the dead leaves and rubbish amongst which the species conceal themselves by day, and *Scoparia* the mottled black and white, or grey effects of the lichens which it frequents in all stages. Families, such as the Arctiadae or Zygaenidae, which are generally brightly coloured, do not happen to occur in the islands at all. But after making due allowance for these circumstances, it appears that there is a real local tendency to a dusky suffusion, which often obscures brighter pigments, even when they are perceptibly present. The best evidence of this is furnished by the local forms of apodemic species; thus the local race of *Hypocala andremona* is so much overspread with dark suffusion that it has been regarded as a distinct species; and there is a native race of *Heliothis armigera*, in which the suffused dark terminal band of the hindwings is considerably extended. *Margaronia cyanomichla* belongs to a group of the genus of which all the other members are sharply and clearly marked with prismatic-white fasciae, but itself has these markings more or less obscurely suffused with dusky-violet. Many species of various genera, when examined with a lens, show a not inconsiderable admixture of crimson, green, yellow, or blue scales, but so combined with other dark scales that there is little or no appearance of these colours in the general effect; such are *Hypenodes cyanias*, several species of *Eucymatoge*, *Mestolobes*, and even *Scoparia*. It seems to me probable that this tendency is connected with the superabundant moisture of the climate, and is due to influences exerted in the pupal stage, but it is sufficient here to call attention to it as an existing fact.

Imitative Colouring.

The question of the assimilation of the colouring of a species to the rocks or plants which it frequents, can only be adequately treated by the collector, who has seen the insect amongst its natural surroundings. But there seem to be two or three cases of apparent mimicry—the assumption by a species of a facies foreign to its own genus but closely resembling that of an unrelated genus—which require to be noticed here, though they can only be adequately explained by observations made on the spot. These are as follows:

Hypenodes epichalca and *H. cyanias* (although not at all resembling one another) are so like species of *Phlyctaenia* in general appearance that at first I had grouped them with that genus, and was much surprised, on a structural examination, to discover their true position. There is no exact imitation, but *H. epichalca*, which is yellow and black, has a strong general resemblance to *Phlyctaenia chalcophanes*, and occurs in the same locality, and at the same season; and *H. cyanias*, which is really partially coloured with violet-blue but does not show it to the naked eye, is very similar to *P. ennychioides*, a dark purplish-fuscous species which is found with it.

Phlyctaenia heterodoxa is quite unlike all its congeners, and has assumed the facies of *Omiodes demaratalis*; the character of the lines and spots has been entirely altered, the black orbicular dot and straight pale second line being faithfully reproduced. This species is from Maui, and I have no record of *O. demaratalis* from that island, yet as it is one of the commoner species, and is known from Hawaii, Oahu, and Kauai, it does probably occur in the other islands as well.

In each of these three cases the supposed mimicking species is apparently comparatively scarce, and the mimicked one undoubtedly common. But there is at present no evidence to show that the latter is in any way distasteful or otherwise protected, without which the proof breaks down; future collectors are therefore invited to experiment in this direction. It must be remembered that it is also quite possible that the members of each pair of similar species are coloured alike merely in similar adaptation to identical surroundings.

Dorsal scale-projection of forewings.

Finally, I may note that in many of the Pyraustidae there is an unusual tendency to increased development of the dorsal scale-projection towards the base of the forewings, which is normally inconspicuous. In some species it becomes so prominent that I at first thought it might be of value as a classificational character; but finding that it occurred in various genera, yet was often conspicuous in one and obsolete in another of closely allied species, I was forced to the conclusion that it was of no importance as a test of relationship. It is therefore probably an adaptive modification, depending on external circumstances.

§ 2. Systematic account of the Macrolepidoptera.

CARADRININA.

CARADRINIDAE.

Leucania *Ochs.*

Head rough-scaled. Eyes hairy. Antennae in ♂ ciliated. Thorax with or without slight anterior crest. Abdomen not crested.

1. Forewings with first and second lines entire ....2.
   „ „ reduced to dots or obsolete ....5.
2. First line very oblique, to about middle of dorsum ....3.
   „ not very oblique, to about $\frac{2}{5}$ of dorsum ....4.

3. Forewings more or less rosy or red-tinged ....(*4*) *euclidias.*
   ,, not red-tinged ....(*3*) *niphadopa.*
4. Orbicular and reniform white ....(*2*) *compsias.*
   ,, ,, not white ....(*1*) *anthracias.*
5. Reniform marked by a white dot ....6.
   ,, not white-marked ....(*6*) *typhlodes.*
6. Forewings with oblique subapical shade reaching second line ....(*9*) *unipuncta.*
   ,, without subapical shade reaching second line ....7.
7. Hindwings rosy-tinged ....(*7*) *pyrrhias.*
   ,, not rosy-tinged ....8.
8. Forewings strigulated with fuscous ....(*8*) *amblycasis.*
   ,, not strigulated ....(*5*) *macrosaris.*

(1) *Leucania anthracias*, sp. nov.

♂. 34—35 mm. Head and thorax fuscous or reddish-fuscous, darker posteriorly, pale-sprinkled. Base of abdomen with dense lateral tufts concealed in basal cavities. Forewings dark fuscous, slightly or strongly mixed with dull crimson, thinly whitish-sprinkled; subbasal, first, and second lines obscurely dark-edged, first hardly defined, second moderately curved; median shade obscurely darker; orbicular and reniform blackish-outlined, orbicular small, round, pale, dark-centred; subterminal line bisinuate, formed of obscure whitish-ochreous spots, sometimes nearly obsolete except at tornus. Hindwings pale fuscous. (Plate IV. fig. 1.)

2 specimens; 1 Olaa, Hawaii, in September; 1 Haleakala, Maui, at 9000 feet, in October.

(2) *Leucania compsias*, sp. nov.

♂♀. 33—36 mm. Head and thorax whitish-ochreous, sometimes partially or wholly mixed with dark fuscous. Base of abdomen densely hairy, in ♂ with dense lateral tufts concealed in basal cavities. Forewings rather dark brown or fuscous, sometimes much mixed with ferruginous, basal and median areas sometimes much suffused with whitish-ochreous; subbasal, first, and second lines whitish-ochreous or white, edged with dark fuscous, waved, first nearly straight, rather oblique, running to dorsum at $\frac{2}{5}$, second moderately unevenly curved; a suffused darker median shade, right-angled in middle; orbicular small, transverse, somewhat constricted in middle, white; reniform forming an inverted U, white, sometimes connected beneath with orbicular by a white spot; subterminal line whitish, waved, terminal area beyond this sometimes wholly suffused with whitish. Hindwings in ♂ pale fuscous, in ♀ fuscous; a pale subterminal line more or less distinctly indicated. (Plate IV. fig. 2.)

5 specimens; 3 Kilauea, Hawaii, in August; 2 Olaa, Hawaii, at 2000 feet, in September and November. A variable species.

(3) *Leucania niphadopa*, sp. nov.

♀. 34—35 mm. Head and thorax rather dark fuscous, pale-sprinkled. Forewings rather dark fuscous, faintly purplish-tinged; first and second lines hardly paler, obscurely dark-edged, first straight, oblique, running to near middle of dorsum, second gently curved on upper $\frac{2}{3}$; orbicular small, round, white; reniform represented by two transversely placed finely connected small white spots, followed by two white dots between which is an irregular white spot partially suffused with ochreous-yellow; an obscure darker praesubterminal shade. Hindwings rather light fuscous.

2 specimens, Olaa, Hawaii, at 2000 feet, in November.

(4) *Leucania euclidias*, sp. nov.

♂♀. 28—36 mm. Head and thorax light rosy-ochreous or light crimson-fuscous, seldom fuscous. Base of abdomen densely hairy, in ♂ with dense lateral tufts concealed in basal cavities. Forewings varying from pale rosy-ochreous to deep red, partially or wholly suffused with fuscous, with slight purplish reflections, rarely more or less irrorated with white; subbasal line seldom partly whitish; first and second lines pale or seldom whitish, dark-edged, first straight, very oblique, running to about middle of dorsum, second nearly straight; orbicular round, small or dot-like, clear white or seldom ochreous-yellow, dark-edged, or often reduced to a dark fuscous dot; reniform represented by an oblique transverse linear usually clear white mark, seldom only paler or ochreous-yellowish, sometimes doubled, seldom divided into two spots, in one specimen connected beneath with orbicular by a clear white streak; subterminal line pale or whitish, slightly sinuate, usually preceded by a dark band. Hindwings in ♂ rather light fuscous, somewhat mixed with pale ochreous, suffused with whitish-ochreous towards costa and termen; in ♀ wholly rather dark fuscous. (Plate III. figs. 1—1 *h*.)

87 specimens; 16 Olaa, Hawaii; 3 Kilauea, Hawaii; 2 Kona, Hawaii, at 3000 feet; 41 Haleakala, Maui, at 5000 feet; 4 Kaholuamano, Kauai; 19 Mts. Waimea, Kauai; 1 Lihui, Kauai, at 1500 feet; 1 Lanai, 2000 feet; in February, and from April to November. Exceedingly variable.

(5) *Leucania macrosaris*, sp. nov.

♂. 34—37 mm. Head and thorax light brownish-ochreous, slightly rosy-tinged. Abdomen with lateral dense tufts of very long pale brownish-ochreous hairs attached to a long chitinous filament, rising from basal cavities. Forewings brownish-ochreous, reddish-tinged; first and second lines formed by series of indistinct dark fuscous dots, second rather strongly curved; lower end of reniform forming a clear white dot, followed by a fuscous dot. Hindwings pale greyish-ochreous.

2 specimens; 1 Kona, Hawaii, at 1500 feet; 1 Olaa, Hawaii; in June.

(6) *Leucania typhlodes*, sp. nov.

♂. 35 mm. Head and thorax red-brownish-ochreous. Abdomen densely hairy towards base, with dense expansible pale brownish-ochreous tufts at base beneath, and also in lateral basal cavities. Forewings pale brownish-ochreous, suffused throughout with light dull reddish, with some scattered indistinct fuscous strigulae; lower end of reniform represented by a cloudy dark fuscous suffusion; second line represented by a curved series of very obscure dark fuscous dots. Hindwings pale greyish-ochreous, somewhat rosy-tinged.

1 specimen, Olaa, Hawaii, in July.

(7) *Leucania pyrrhias*, sp. nov.

♂♀. 39—46 mm. Head and thorax brown-reddish irrorated with whitish-ochreous. Abdomen densely hairy towards base, in ♂ with dense expansible brownish-ochreous tufts at base beneath, and also in lateral basal cavities. Forewings pale brownish-ochreous, densely suffusedly strigulated throughout with brown-reddish; veins posteriorly ochreous-whitish, sprinkled with dark fuscous; costal edge sometimes white; first and second lines formed by series of indistinct dark fuscous dots, second rather strongly curved; lower end of reniform forming a small white dot, followed by a dark fuscous suffusion. Hindwings light rosy-ochreous. (Plate IV. fig. 3.)

9 specimens; 4 Mts. Waimea, Kauai, at 4000 feet; 5 Kaholuamano, Kauai; from April to June.

(8) *Leucania amblycasis*, sp. nov.

♂♀. 38—41 mm. Head and thorax whitish-ochreous, somewhat brownish-tinged, thorax posteriorly with a few blackish specks. Abdomen in ♂ with very long dense expansible pale ochreous lateral tuft attached to a broad spoon-shaped chitinous process rising from basal cavities, and dense yellowish expansible tufts in middle of base beneath. Forewings pale brownish-ochreous, indistinctly strigulated with fuscous or grey; dark fuscous dots near base in middle and on costa, indicating subbasal line; first and second lines indicated by series of dark fuscous dots, second partially double, moderately curved; lower edge of reniform forming a white dot, edged with dark fuscous and followed by a small dark fuscous suffusion; in ♀ orbicular and reniform obscurely defined, pale yellowish-ochreous; a wedge-shaped faint darker suffusion on termen beneath apex, not reaching second line. Hindwings light greyish-ochreous, irregularly suffused with fuscous, becoming darker fuscous posteriorly.

7 specimens; 2 Molokai, in May; 3 Lanai, at 2000 feet, in February; 1 Mts. Waimea, Kauai, at 4000 feet, in June; 1 Haleakala, Maui, at 5000 feet, in May.

(9) *Leucania unipuncta* Haw. (*extranea* Guen.).

3 specimens; 2 Kona, Hawaii, at 4000 feet, in July; 1 Haleakala, Maui, at 5000 feet, in April. Occurs also native in America, New Zealand, Australia, S. Asia, and as a casual immigrant probably throughout the warmer regions of the world.

AGROTIS *Ochs.*

Head rough-scaled. Eyes glabrous. Antennae in ♂ ciliated, often acutely bidentate or bipectinated with apex simple. Thorax usually with more or less developed anterior and posterior crests. Abdomen not crested. Tibiae all spinose.

1. Antennae in ♂ at most serrulate .... 2.
,, ,, acutely bidentate or bipectinated .... 8.
2. Forewings with veins conspicuously pale .... (*19*) *neurogramma.*
,, ,, not conspicuously pale .... 3.
3. Hindwings grey-whitish, with purple reflections .... (*2*) *saucia.*
,, fuscous .... 4.
4. Forewings at least partly brown-reddish .... 5.
,, at most faintly rosy-tinged .... 7.
5. Forewings with terminal area markedly pale .... (*21*) *cinctipennis.*
,, ,, not pale .... 6.
6. Reniform marked posteriorly with a whitish-ochreous crescentic spot ...(*20*) *selenias.*
,, not so marked .... (*22*) *chersotoides.*
7. Forewings shorter, claviform strongly marked, broader .... (*16*) *mesotoxa.*
,, longer, claviform faintly indicated, narrower .... (*15*) *crinigera.*
8. Antennae in ♂ bipectinated .... 9.
,, ,, bidentate with triangular processes .... 12.
9. Forewings with dark submedian streak from base to middle .... 10.
,, without such streak .... 11.
10. Forewings with dark spots between bases of veins 2—7 .... (*4*) *arenivolans.*
,, without such spots .... (*3*) *microreas.*
11. Hindwings grey-whitish .... (*1*) *ypsilon.*
,, fuscous .... (*6*) *cremata.*
12. First and second lines wholly absent .... 13.
,, ,, more or less indicated .... 16.

13.	Lower margin of cell marked with a whitish streak	14.
	,, ,, not marked with whitish streak	15.
14.	Orbicular and reniform combined, present	(*9*) *dislocata.*
	,, ,, wholly absent	(*8*) *aulacias.*
15.	Forewings fuscous, spots black-edged	(*7*) *perigramma.*
	,, red-brown, spots not black-edged	(*23*) *ceramophaea.*
16.	Claviform dash-like, blackish	(*14*) *spoderopa.*
	,, not dash-like	17.
17.	Forewings with defined blackish submedian streak (at least outlined) from base to middle	18.
	,, without such streak	19.
18.	First and second lines entire, dark fuscous	(*5*) *panoplias.*
	,, ,, indicated by dots or indistinct	(*10*) *xiphias.*
19.	Forewings with veins black	(*11*) *melanoneura.*
	,, ,, not black	20.
20.	Median line absent	21.
	,, present	22.
21.	Orbicular distinct	(*12*) *tephrias.*
	,, obsolete	(*13*) *photophila.*
22.	Orbicular dot-like	(*17*) *epicremna.*
	,, not dot-like	23.
23.	Median line curved	24.
	,, bent in middle	(*18*) *baliopa.*
24.	Forewings ochreous or brown, orbicular fuscous	(*24*) *psammophaea.*
	,, fuscous, orbicular pale, dark-centred	(*25*) *austalea.*

(1) *Agrotis ypsilon* Rott. (*suffusa* Hüb.).

11 specimens; 3 Kona, Hawaii, at 1500—4000 feet; 1 Kilauea, Hawaii; 1 Haleakala, Maui, at 5000 feet; 1 Kaholuamano, Kauai; 1 Waianae Mts., Oahu, at 2000 feet; 1 Kaala Mts., Oahu, at 1000 feet; 2 Lanai, at 2000 feet; 1 Molokai, at 3000 feet; from February to September; apparently established and common generally. Occurs also throughout the northern hemisphere.

(2) *Agrotis saucia* Hüb.

3 specimens; 2 Haleakala, Maui, at 5000 feet; 1 Mts. Waimea, Kauai, at 4000 feet; in May. Occurs also in N. America, W.C. and S. Europe, and N. Africa.

(3) *Agrotis microreas*, sp. nov.

♂ ♀. 22—26 mm. Head and thorax brown mixed with black, patagia with an oblique whitish streak. Antennae in ♂ moderately bipectinated. Forewings ferruginous-brown, much mixed with black, disc in ♀ light ochreous; veins partially suffused with white, especially lower margin of cell, 1 *b*, and 6; orbicular, reniform, and a broad streak beneath cell from base to middle darker. Hindwings dark fuscous, darkest terminally. (Plate IV. fig. 4.)

2 specimens, Kilauea, Hawaii, in September. Differs from all the rest by its small size and dark fuscous hindwings.

(4) *Agrotis arenivolans* Butl.

Agrotis arenivolans Butl. Ent. Mo. Mag. xv. p. 269.

♂ ♀. 38—52 mm. Head and thorax light brownish sprinkled with whitish and dark fuscous, thorax broadly streaked longitudinally with dark and pale. Antennae in ♂ shortly bipectinated. Forewings fuscous, whitish-sprinkled; veins sometimes forming white streaks; a thick streak beneath cell from base to beyond middle, attenuated and acute at each end, and five elongate spots between bases of veins 2—7 (fourth shortest and sometimes much reduced) dark fuscous, blackish-edged; orbicular and reniform edged with pale or whitish, usually dark-outlined, orbicular small, oval, usually preceded and followed by elongate dark fuscous spots; in one specimen beneath and beyond these dark markings the ground is wholly suffused with ochreous-whitish; sometimes a dark fuscous dorsal streak from about middle to tornus; an irregular terminal series of long wedge-shaped sometimes partly confluent dark fuscous spots, darker-edged, shortest below apex and below middle, longest in middle. Hindwings fuscous.

3 specimens; 2 Kona, Hawaii, at 4000 feet, in July; 1 Haleakala, Maui, at 10,000 feet, in April. Also one received from Mr Blackburn, and the original types in the British Museum, which are said to be from Maui, taken flying by day on sandhills near the sea. It varies in intensity of marking.

(5) *Agrotis panoplias*, sp. nov.

♂. 39 mm. Head and thorax fuscous irrorated with white. Antennae bidentate with rather long triangular processes. Forewings fuscous irrorated with white, veins dark fuscous; subbasal line dark fuscous, interrupted; first and second lines dark fuscous, first irregularly angled, beneath costa acutely, second slightly waved; a dark fuscous posteriorly dilated streak beneath cell from base to middle; orbicular and reniform fuscous, dark-outlined, approximated, connected by a narrow dark streak, lower edge of reniform confluent with two small dark fuscous spots between bases of veins 2—4; a dark suffusion towards costa before apex, one towards termen above middle, and one above tornus. Hindwings fuscous, lighter at base, darker posteriorly. (Plate IV. fig. 5.)

1 specimen, Kona, Hawaii, at 4000 feet, in July.

(6) *Agrotis cremata* Butl.

Spaelotis cremata Butl. Ent. Mo. Mag. XVII. p. 8, Ann. Mag. N. H. (5) VII. 1881, p. 321.

♂ ♀. 40—43 mm. Antennae in ♂ shortly bipectinated. Forewings light brownish, irrorated with whitish and sprinkled with black; subbasal, first, and second lines pale, dark-edged, first dentate, especially acutely inwards above middle; median cloudy, faint; orbicular and reniform faintly pale-edged, hardly defined, sometimes separated by a small spot of blackish scales; subterminal line interruptedly dark-edged, especially anteriorly. Hindwings rather light fuscous, darker posteriorly.

No specimens of this distinct species were taken; I have therefore described the two original types in the British Museum collection, which were bred from pupae obtained in September in sandhills, Maui. Larva described in Ent. Mo. Mag. XIX. 56.

(7) *Agrotis perigramma*, sp. nov.

♂. 36—39 mm. Head and thorax fuscous, irrorated with fuscous-whitish. Antennae bidentate with rather long triangular processes. Forewings fuscous, finely irrorated with whitish and dark fuscous, appearing ashy-fuscous; veins marked with darker lines; spots outlined with black, orbicular oval, reniform roundish, sometimes connected with orbicular by some black scales and followed by a small spot of black scales, claviform large, elongate, extending to not far from base; traces of an irregular darker terminal shade. Hindwings light fuscous, becoming rather dark fuscous posteriorly.

2 specimens, Kilauea, Hawaii, in August.

(8) *Agrotis aulacias*, sp. nov.

♂ ♀. 32—38 mm. Head and thorax brownish-ochreous or brown. Antennae in ♂ bidentate with short triangular teeth. Forewings fuscous or ochreous-brown, sometimes slightly whitish-sprinkled; slender whitish streaks along lower margin of cell and vein 1 *b*; remaining veins also often more finely and indistinctly whitish. Hindwings fuscous. (Plate IV. fig. 6.)

13 specimens, Haleakala, Maui, at 8000—10,000 feet, in April and May. Also one received from Mr Blackburn, probably from the same locality.

(9) *Agrotis dislocata* Walk.

Leucania dislocata Walk. Cat. IX. p. 112.

♂♀. 34—37 mm. Head and a marginal band along front of thorax light ochreous-brown, rest of thorax whitish-fuscous. Antennae in ♂ bidentate with triangular processes. Forewings light fuscous, more or less irrorated with white, and sometimes darker-sprinkled; veins marked with dark fuscous lines, except lower margin of cell, which is white; interior of cell paler and more ochreous, usually marked with a black dot towards base; orbicular and reniform combined into an elongate posteriorly abruptly dilated mark, fuscous, outlined with black; a darker fuscous black-outlined streak beneath cell from base to middle, somewhat dilated posteriorly; a pale ochreous longitudinal suffusion beneath this from base to near tornus; sometimes short undefined blackish dashes or dark-outlined marks between bases of veins 2—6. Hindwings fuscous.

7 specimens; 3 Kona, Hawaii, at 1500—4000 feet, in June; 1 Kaholuamano, Kauai, at 4000 feet, in April; 3 Lanai, at 2000 feet, in February. Also several others received from Mr Blackburn and in the British Museum collection, apparently from Oahu.

(10) *Agrotis xiphias*, sp. nov.

♂♀. 33—36 mm. Head dark fuscous, sometimes mixed or suffused with whitish. Thorax fuscous to fuscous-whitish, anterior half of collar sharply dark fuscous, with a triangular blackish blotch on each side of back behind collar, sometimes extended as a streak to posterior margin. Antennae in ♂ bidentate with triangular teeth. Forewings brownish or fuscous, more or less irrorated or sometimes much suffused with whitish; a thick black streak, sometimes edged with pale yellowish, beneath cell from base to middle, seldom only indicated by black outline; sometimes two small black spots between bases of veins 2—4; orbicular and reniform black, or light or dark fuscous black-outlined, connected by a narrow black spot, orbicular pear-shaped, sometimes preceded by a black mark; second line indicated by a series of dark dots; subterminal pale, obscure, partially edged with darker suffusion. Hindwings rather light fuscous. (Plate IV. fig. 7.)

14 specimens, Haleakala, Maui, at 5000 feet (except one at 9000), in April, May, and October. Variable in intensity of marking.

(11) *Agrotis melanoneura*, sp. nov.

♂. 36 mm. Head brown, mixed with dark fuscous. Thorax pale greyish-ochreous irrorated with fuscous, anterior half of collar dark fuscous. Antennae bidentate with triangular teeth. Forewings pale ochreous mixed with light brownish, veins marked with blackish lines; basal area suffusedly mixed with dark brown and black; first line indistinctly blackish-edged; orbicular and reniform dark fuscous, edged with pale ochreous, partially black-outlined, connected by an elongate dark fuscous spot; claviform oval, fuscous, black-outlined; second line edged by series of undefined blackish-fuscous dots; subterminal pale, obscure, edged anteriorly with dark fuscous suffusion on costa and in middle, posteriorly by dark fuscous suffusion extending to termen. Hindwings fuscous-whitish irrorated with fuscous; a fuscous crescentic discal mark, and indistinct subterminal shade.

1 specimen, Kona, Hawaii, at 4000 feet, in July.

(12) *Agrotis tephrias*, sp. nov.

♂♀. 34—40 mm. Head and thorax brownish sprinkled with whitish, collar often with a dark transverse median streak and anterior half paler, patagia with an oblique white streak behind collar. Antennae in ♂ bidentate with triangular teeth. Forewings fuscous, sometimes ferruginous-tinged, irrorated with whitish except in disc, which is darker-mixed; first and second lines obscurely whitish, dark-edged, sometimes very undefined; orbicular rather small, oval, whitish, sometimes dark-centred, dark-outlined; reniform whitish-edged; claviform slender, dark fuscous, undefined, crossing first line and sometimes extended to base; subterminal line obscurely whitish, edged anteriorly with darker suffusion. Hindwings light greyish-ochreous, posteriorly fuscous-tinged.

8 specimens; 3 Kaholuamano, Kauai, in April; 5 Mts. Waimea, Kauai, at 4000 feet, in May and June.

(13) *Agrotis photophila* Butl.

Leucania photophila Butl. Ent. Mo. Mag. XV. p. 269; *Spaelotis lucicolens* ib. XVII. p. 7; Ann. Mag. N. H. (5) VII. 1881, p. 321.

♂. 35—40 mm. Antennae in ♂ bidentate with long triangular processes. Forewings light greyish-ochreous sprinkled with fuscous; subbasal, first, and second lines indicated by more or less distinct blackish dots, first and second sometimes forming undefined waved lines; posterior edge of reniform sometimes indicated by black scales; traces of a darker praesubterminal shade; a terminal series of dark fuscous dots. Hindwings light greyish-ochreous, posteriorly infuscated.

No specimens of this species were taken; I have described the two typical specimens in the British Museum; these were taken at light near Honolulu, Oahu, and the species is stated to be rare.

(14) *Agrotis spoderopa*, sp. nov.

♂ ♀. 38—40 mm. Head and thorax light greyish-ochreous or brownish. Antennae in ♂ bidentate with triangular processes. Forewings light fuscous or brownish, suffusedly irrorated with whitish, sometimes reddish-tinged in disc; subbasal line indicated on costa by dark margins; first line indistinctly dark-edged, twice angulated; second indicated by a fine dark fuscous acutely waved-dentate line, strongly curved; orbicular and reniform obscurely pale-edged, orbicular small, oval, sometimes with posterior projection; claviform dash-like, blackish or dark fuscous, tending to be extended as an undefined plical line to base; subterminal line indicated by indistinct irregular darker anterior margin. Hindwings greyish-ochreous. (Plate IV. fig. 8.)

6 specimens, Haleakala, Maui, at 5000 feet, in March and April. Also one received from Mr Blackburn.

(15) *Agrotis crinigera* Butl.

Spaelotis crinigera Butl. Ann. Mag. N. H. (5) VII. 1881, p. 321.

♂ ♀. 49—54 mm. Head and front of thorax brownish, rest of thorax light fuscous. Antennae in ♂ filiform. Forewings long, rather narrow; light fuscous, darker-sprinkled, sometimes partially faintly rosy-tinged; subbasal and first lines obscurely pale, dark-edged, first irregularly waved-dentate, very acutely on vein 1 *b*; median thick, cloudy, dark fuscous, slightly curved; second with dark inner edge acutely waved-dentate, outer faint or obsolete, regular; orbicular oval, dark-centred, dark-outlined; reniform dark-suffused, including three obscure paler transverse marks, resting on posterior edge of median line; claviform faintly indicated, narrow, elongate; subterminal line sometimes faintly paler, faintly darker-edged anteriorly. Hindwings light fuscous.

3 specimens; 2 Waialua, Koolau range, Oahu, in March; 1 Lanai, at 2000 feet, in February. There are five specimens in the British Museum collection; the species is recorded by Mr Blackburn from Oahu, Maui, and Hawaii, and said to be uncertain in appearance but sometimes to occur in thousands, usually near sea-level.

(16) *Agrotis mesotoxa*, sp. nov.

♀. 44—46 mm. Head and thorax brown. Forewings relatively markedly shorter than in *A. crinigera*; brown, sprinkled with dark fuscous, and sometimes slightly with whitish; lines as in *A. crinigera*, but median rather more curved, second only slightly waved, subterminal more strongly dark-margined, forming a conspicuous pale elongate dot above middle; spots as in *A. crinigera*, but claviform strongly marked, dark-outlined, shorter and broader basally. Hindwings fuscous.

2 specimens, Kona, Hawaii, at 4000 feet, in July and August.

(17) *Agrotis epicremna*, sp. nov.

♂ ♀. 40—45 mm. Head and thorax grey-whitish mixed with black and ochreous. Antennae in ♂ bidentate with rather long triangular processes. Forewings fuscous, darker-mixed, partially slightly reddish-tinged; subbasal, first, and second lines hardly paler, edged on one side by waved partially interrupted blackish lines; median irregular, cloudy, blackish; orbicular dot-like, cloudy, blackish; reniform mostly suffused with blackish; subterminal line pale, interrupted, edged on both sides by series of suffused dark spots. Hindwings light fuscous, terminally broadly suffused with darker. (Plate IV. fig. 9.)

5 specimens, Haleakala, Maui, at 9000—10,000 feet, in May and October.

(18) *Agrotis baliopa*, sp. nov.

♂ ♀. 39—43 mm. Head and thorax grey-whitish mixed with blackish, sometimes partially yellowish-tinged. Antennae in ♂ bidentate with rather long triangular processes. Forewings light fuscous, blackish-sprinkled, sometimes partially slightly reddish-tinged; subbasal, first, and second lines obscurely pale or partially whitish, edged on one side by waved blackish lines; median cloudy, darker, bent in middle; orbicular and reniform whitish-edged, black-outlined, orbicular roundish; claviform suboval, sometimes slightly whitish-edged, black-outlined; subterminal line pale or whitish, interrupted, edged on both sides by series of small dark fuscous spots. Hindwings light fuscous, in ♀ sometimes darker posteriorly.

9 specimens; 8 Haleakala, Maui, at 6000—10,000 feet, in April and May; 1 Kilauea, Hawaii, in August.

(19) *Agrotis neurogramma*, sp. nov.

♂. 44 mm. Head and thorax brown-reddish mixed with black, centre of thorax whitish-sprinkled, edge of collar whitish. Antennae serrulate. Forewings brown-reddish, suffusedly mixed with black; veins marked with whitish-ochreous lines; subbasal, first, and second lines pale, black-edged; median dark, cloudy, bent in middle; orbicular and reniform finely edged with whitish-ochreous, separated by a subquadrate blackish spot, orbicular oblique-oval, preceded by a similar blackish spot; subterminal line pale, broadly edged with blackish suffusion. Hindwings whitish-ochreous, fuscous-tinged, more infuscated terminally, veins and a crescentic discal mark fuscous; a dark fuscous terminal line. (Plate IV. fig. 10.)

1 specimen, Kilauea, Hawaii, in August.

(20) *Agrotis selenias*, sp. nov.

♂ ♀. 42—48 mm. Head and thorax brown-reddish sprinkled with black. Antennae in ♂ hardly serrulate. Forewings brown-reddish, sprinkled with black; subbasal and first lines black-edged; orbicular oblique-oval, sometimes partially edged with whitish-ochreous, black-outlined, separated from reniform by a subquadrate dark reddish-fuscous spot; claviform indistinctly dark-outlined; median line only distinct on costa; reniform anteriorly edged with a few whitish-ochreous scales and black outline, posteriorly marked with a clear whitish-ochreous crescentic spot; second line indistinctly dark-edged, waved, interrupted; subterminal obscurely pale, edged anteriorly with some indistinct small dark spots, on costa by one larger and more distinct. Hindwings rather light fuscous or whitish-fuscous, darker posteriorly; a darker crescentic discal mark.

16 specimens; 9 Kaholuamano, Kauai, at 4000 feet, in April; 6 Mts. Waimea, Kauai, at 4000 feet, in May and June; 1 Olaa, Hawaii, in September.

(21) *Agrotis cinctipennis* Butl.

Apamea cinctipennis Butl. Ann. Mag. N. H. (5) VII. 1881, p. 323.

♂ ♀. 38—40 mm. Head and thorax red-brown mixed with black, thorax sometimes more or less sprinkled with white. Antennae in ♂ hardly serrulate. Forewings brown-reddish, strigulated with dark fuscous, sometimes partially mixed with whitish-ochreous; subbasal and first lines blackish-edged; orbicular rather oblique-oval, grey or white, with faint darker central dot; reniform partially edged with whitish-ochreous or white, black-outlined, sometimes separated from orbicular by quadrate spot of blackish suffusion; claviform short, indistinctly dark-outlined; second line dark-edged, sometimes partly indistinct; subterminal whitish-ochreous, anteriorly sharply defined and edged with dark fuscous suffusion, posteriorly not dark-edged, terminal area light brown-reddish, mixed or almost wholly suffused with whitish-ochreous. Hindwings light fuscous, posteriorly darker.

4 specimens; 1 Olaa, Hawaii, at 2000 feet, in November; 1 Haleakala, Maui, at 5000 feet, in April; 1 Kaholuamano, Kauai, in April; 1 Waianae Mts., Oahu, at 2000 feet, in April. Also one specimen in the British Museum collection.

(22) *Agrotis chersotoides* Butl.

Apamea chersotoides Butl. Ann. Mag. N. H. (5) VII. 1881, p. 322.

♂♀. 31—40 mm. Head and thorax red-brown or dark fuscous, edge of collar and a broad irregular median streak from collar to posterior margin often grey-whitish or whitish-ochreous. Antennae in ♂ hardly serrulate. Forewings brownish-ochreous, variably suffused with brown-reddish, costa from base to subterminal line often broadly suffused with dark reddish-fuscous, more broadly anteriorly, in ♀ often extending over whole wing, sometimes a costal streak of lighter suffusion from base to second line; subbasal and first lines blackish-edged; orbicular and reniform rather dark slaty-fuscous or sometimes reddish, partly edged with whitish-ochreous and blackish-outlined, connected by a quadrate darker spot; claviform small, oval, partly indistinctly blackish-outlined; second line indistinctly dark-edged, sometimes with dots only, well-marked on costa; subterminal pale, obscure, partially indistinctly darker-edged. Hindwings whitish-fuscous, becoming fuscous posteriorly.

13 specimens; 5 Kona, Hawaii, at 4000 feet; 6 Mts Waimea, Kauai, at 4000 feet; 2 Kaholuamano, Kauai; from April to September. Also two examples in the British Museum, from Maui. Varies very considerably in colouring.

(23) *Agrotis ceramophaea*, sp. nov.

♂. 38 mm. Head and thorax red-brown. Antennae bidentate with triangular teeth. Forewings red-brown; orbicular, claviform, and reniform fuscous, orbicular and reniform connected by a small quadrate dark reddish-fuscous spot, laterally edged finely with whitish-ochreous. Hindwings light fuscous.

1 specimen, Kilauea, Hawaii, in September.

(24) *Agrotis psammophaea*, sp. nov.

♂♀. 35—38 mm. Head and thorax brownish-ochreous or brown, somewhat sprinkled with pale and blackish, anterior half of collar sharply blackish-fuscous. Antennae in ♂ bidentate with triangular teeth. Forewings varying from pale brownish-ochreous to brown, sometimes sprinkled with black or much suffused with dark fuscous; subbasal and first lines partially dark-edged; spots fuscous or dark fuscous, black-outlined, orbicular and reniform sometimes connected by a small blackish-fuscous spot or bar, claviform elongate-oval; median line cloudy, darker, curved; second dark-edged, margins usually dotted; subterminal obscurely pale, partially and irregularly edged with spots of dark suffusion. Hindwings light fuscous. (Plate IV. fig. 11.)

8 specimens, Haleakala, Maui, at 5000 feet, in May. Variable in intensity.

(25) *Agrotis austalea*, sp. nov.

♂♀. 32—38 mm. Head and thorax pale brownish to fuscous, often whitish-sprinkled, collar often with a median transverse blackish line, seldom with anterior half blackish-fuscous. Antennae in ♂ bidentate with triangular teeth. Forewings light or seldom rather dark fuscous, sometimes slightly ochreous or reddish-tinged, more or less irrorated with whitish, and somewhat sprinkled with black; subbasal and first lines blackish-edged; orbicular pale, more or less distinctly dark-centred, partly black-outlined; claviform short, semi-oval, sometimes fuscous, black-outlined; reniform more or less dark, anteriorly pale-edged, blackish-outlined, connected with orbicular by a small blackish-fuscous spot; median line cloudy, darker, curved; second forming a more or less distinct series of dark fuscous marks and two series of blackish dots; subterminal obscurely pale, more or less edged with dark fuscous suffusion, especially posteriorly, and preceded on costa by a well-marked sub-triangular spot. Hindwings fuscous, somewhat lighter anteriorly, with a darker crescentic discal mark.

14 specimens; 13 Kona, Hawaii, at 4000 feet, from July to September; 1 Mts. Waimea, Kauai, at 4000 feet, in June. Varies considerably in colouring.

HELIOTHIS *Ochs.*

(1) *Heliothis armigera* Hüb. (*conferta* Walk.).

5 specimens; 2 Kona, Hawaii, at 2000—4000 feet, in July; 2 Wailuku, Maui; 1 Lanai, at 2000 feet, in February. Also recorded by Mr Blackburn from Haleakala, Maui, and Honolulu, Oahu. Variable here as elsewhere, inclining to a rather large and deeply coloured form, recorded by Butler under the name of *conferta* Walk., which is however merely a synonym. Occurs also generally throughout the world except in cold regions.

SPODOPTERA *Guen.*

(1) *Spodoptera mauritia* Boisd. (*ingloria* Walk.).

17 specimens; 12 Kona, Hawaii, at 1500—4000 feet, from June to September; 2 Wailuku, Maui; 2 Lanai, at 2000 feet, in February; 1 Waialua, Koolau range, Oahu, in March. Also several sent by Mr Blackburn from Oahu. Occurs also in Australia, S. Asia, and Africa.

(2) *Spodoptera exigua* Hüb. (*flavimaculata* Harv.).

Caradrina venosa Butl. Ent. Mo. Mag. XVII. 7.

5 specimens; 3 Kona, Hawaii, at 4000 feet, in July and August; 2 Lahaina, Maui. Also recorded by Mr Blackburn from Honolulu, Oahu. It occurs throughout the warmer regions of the whole world.

CARADRINA *Ochs.*

Head rough-scaled. Eyes glabrous. Thorax sometimes slightly crested. Abdomen not crested.

The following species, only represented by one ♀ specimen in indifferent preservation, cannot be certainly referred generically; it is however so distinct from any other Hawaiian insect that it cannot be passed over.

(1) *Caradrina exanimis*, sp. nov.

♀. 23 mm. Head and thorax whitish. Abdomen elongate. Forewings rather narrow, termen very oblique; whitish-ochreous, with scattered dark fuscous scales between veins; veins white; cilia whitish irrorated with fuscous. Hindwings whitish.

1 specimen, Kona, Hawaii, at 1500 feet, in September.

PLUSIADAE.

SIMPLICIA *Guen.*

(39) *Simplicia robustalis* Guen. (*caeneusalis* Walk.).

16 specimens, all ♀; 10 Olaa, Hawaii, at 2000 feet, in November and December; 3 Oahu, at 2000 feet, in September; 1 Kawailoe range, Oahu, at 1200 feet, in April; 1 Waianae Mts., Oahu, at 2000 feet, in April; 1 Lanai, at 2000 feet, in February. Also several sent by Mr Blackburn. Occurs throughout Australia, the Malay Archipelago, and India.

HYPENODES *Guen.*

Head loosely scaled, with small frontal tuft. Antennae in ♂ ciliated, or bipectinated with apex filiform. Palpi very long, porrected, second joint thickened with rough projecting scales, terminal rather short, cylindrical. Thorax with appressed scales.

Abdomen with small crest near base. Tibiae smooth-scaled. Forewings: 7 separate, 9 and 10 out of 8. Hindwings: 5 parallel to 4.

1. Hindwings whitish .... 2.
   " fuscous or grey .... 3.
2. Palpi about 6 .... (*1*) *epichalca.*
   " 3 .... (*4*) *sarothrura.*
3. Forewings mixed with violet-blue suffusion .... (*2*) *cyanias.*
   " not mixed with blue .... 4.
4. Second line with upper $\frac{2}{3}$ rectangularly angulated .... (*3*) *oxygramma.*
   " not so formed .... (*5*) *altivolans.*

(1) *Hypenodes epichalca*, sp. nov.

♂♀. 19—21 mm. Head and thorax pale yellow mixed with black. Palpi about 6. Antennae in ♂ moderately bipectinated, towards apex filiform. Forewings broader than in the other species; pale yellow sprinkled with black; lines thick, clear pale yellow, partially strongly edged with black, subbasal rather inwardly oblique, first angulated near costa, second forming a quadrate loop outwards in disc, subterminal sinuate; a series of black dots along posterior third of costa and termen. Hindwings ochreous-whitish; a grey discal dot; sometimes traces of grey postmedian and subterminal lines. (Plate IV. fig. 12.)

4 specimens; 3 Olaa, Hawaii, at 2000 feet, in November; 1 Kilauea, Hawaii, in August.

(2) *Hypenodes cyanias*, sp. nov.

♀. 23 mm. Head and thorax dark fuscous. Palpi about 5. Forewings dark fuscous, suffusedly mixed except on margins with brilliant violet-blue; lines partially marked with yellow-ochreous, interruptedly edged with blackish and irregularly placed tufts of raised scales, subbasal inwardly oblique, first angulated near costa, second irregular, forming a quadrate loop outwards round a dull ochreous blackish-edged discal spot, subterminal sinuate; a terminal series of blackish spots alternating with dark spots in cilia. Hindwings light fuscous; a darker discal spot. (Plate IV. fig. 3.)

1 specimen, Olaa, Hawaii, in September.

(3) *Hypenodes oxygramma*, sp. nov.

♀. 12 mm. Head and thorax pale ochreous mixed with brownish. Palpi about 4. Forewings pale ochreous, irrorated with fuscous and dark fuscous; subbasal line blackish, well-marked, reaching from costa half across wing, posteriorly pale-edged; first and second lines blackish, externally edged with whitish-ochreous, first sinuate outwards below costa and below middle, second with upper $\frac{2}{3}$ forming a rectangular angulation outwards; subterminal whitish-ochreous, edged with dark fuscous, irregularly dentate. Hindwings grey. (Plate IV. fig. 14.)

1 specimen, Kaholuamano, Kauai, in April. This example does not show the abdominal crest, but it may have been abraded.

(4) *Hypenodes sarothrura*, sp. nov.

♂. 19 mm. Head and thorax glossy golden-fuscous, thorax posteriorly suffused with coppery-purplish. Palpi about 3. Abdomen roughly tufted with whitish hairs on sides from middle to apex. Forewings golden-fuscous, base coppery-tinged; an oblique ochreous-yellow costal mark near base, edged on each side with blackish; first line ochreous-yellow, edged posteriorly with black and then in disc with white, thrice sharply dentate; a short oblique pale ochreous-yellow streak from middle of costa; a thick irregular black longitudinal streak in disc from first to second line; second line ochreous-yellow, anteriorly blackish-edged, posteriorly broadly suffused with white, below middle rectangularly broken inwards; subterminal line on lower half white, waved, interrupted, above absorbed in suffusion of second; three whitish dots on posterior portion of costa; a terminal series of small dark fuscous spots. Hindwings with veins 3 and 4 short-stalked; fuscous-whitish; a faint fuscous transverse discal mark.

1 specimen, Olaa, Hawaii, in July.

(5) *Hypenodes altivolans* Butl.

Scoparia altivolans Butl. Ent. Mo. Mag. XVII. p. 9. *Hypenodes altivolans* Butl. Ann. Mag. N. H. (5) VII. 1881, p. 325.

♂♀. 11—22 mm. Forewings varying from pale brownish-ochreous to dark fuscous, with slight purplish reflections, sometimes whitish-sprinkled; a variable black dot beneath costa near base, sometimes connected with costa, sometimes followed by a yellow-ochreous dot; first line more or less blackish-marked, sometimes yellow-ochreous, angulated above middle, twice or thrice dentate; second more or less pale or sometimes yellow-ochreous, irregular, oblique, more or less sinuate outwards in middle, more or less blackish-edged on one or both sides, often followed by a partial band of pale ochreous mixed with whitish, especially towards costa; median line sometimes indicated by a pale mark on costa; a variable black discal spot, round or crescentic or curved-linear or reduced to two dots or wholly absent, sometimes edged with pale or white posteriorly, often connected with second line by a blackish longitudinal suffusion; subterminal fine, whitish, interrupted, bisinuate; all lines sometimes (but seldom) wholly absent. Hindwings from rather light to rather dark grey.

113 specimens; 12 Kona, Hawaii, at 1500—4000 feet; 11 Olaa, Hawaii, at 2000 feet; 10 Hilo, Hawaii, at 2000 feet; 1 Kilauea, Hawaii; 6 Haleakala, Maui, at 5000 feet; 20 Mts. Waimea, Kauai, at 4000 feet; 24 Kaholuamano, Kauai, at 4000 feet; 18 Waianae Mts., Oahu, at 2000 feet; 1 Panoa Valley, Oahu; 1 Kaala Mts., Oahu; 8 Molokai, at 3000 feet; 1 Lanai, 3000 feet; from January to December, apparently throughout the islands up to 5000 feet. Also about 20 specimens received from Mr Blackburn, from Mauna Loa, Hawaii, and other localities. An excessively variable species, differing not only in colour and intensity of marking, but the lines themselves appear to vary greatly in form owing to the obsolescence of certain portions and the confluence of others, the first and second lines sometimes appearing almost straight; the dark spots often look like tufts, but there are no real tufts as in *H. cyanias.* The lighter specimens are usually ♂, the darker ♀, but this is not always the case. *H. croceipicta* Hamps., from Ceylon, approaches it closely, but seems distinct. The European *H. costistrigalis* Steph. seems constantly separable by the whitish hindwings, otherwise it does not differ perceptibly from light-coloured Hawaiian examples. The form *exsularis* Meyr., occurring in New Zealand and Australia, has also whitish hindwings, and is therefore distinct from *altivolans*, but perhaps identical with *costistrigalis.*

NESAMIPTIS, gen. nov.

Head loosely scaled, with frontal tuft. Antennae in ♂ ciliated, with longer setae at each joint. Palpi in ♂ rather long, in ♀ very long, porrected, second joint thickened with rough projecting scales, terminal very short, almost concealed. Thorax with appressed scales. Abdomen without crest. Tibiae with appressed scales. Hindwings: 5 parallel to 4.

Type *N. plagiota.* Differs from *Hypena* especially by the absence of any crest on abdomen.

First line strongly and evenly curved ....(*2*) *obsoleta.*
„ straight on lower half, obsolete above..(*1*) *plagiota.*

(1) *Nesamiptis plagiota,* sp. nov.

♂♀. 30—32 mm. Head and thorax fuscous, whitish-sprinkled. Antennae in ♂ with fascicles of long cilia, setae very long. Forewings fuscous or pale brown, strigulated with dark fuscous and irrorated with whitish; a black dot towards costa at

$\frac{1}{3}$; first line whitish-ochreous or light yellow-ochreous, often strongly edged posteriorly with blackish-fuscous, straight, running from $\frac{1}{4}$ of dorsum very obliquely outwards to middle of disc, where it ceases; second line whitish or whitish-ochreous, thick, straight, slightly more oblique than termen, edged anteriorly with dark fuscous or blackish-fuscous; lower half of median band sometimes darker, or yellowish-tinged, or wholly blackish; reniform indicated by a blackish dot; an oblique darker shade from apex, preceded by a whitish suffusion; lower $\frac{3}{5}$ of subterminal line faintly pale, sometimes preceded by a dark or blackish-fuscous streak. Hindwings fuscous or light fuscous; a darker discal dot. (Plate IV. fig. 15.)

9 specimens; 8 Waianae Mts., Oahu, at 3000 feet, in April; 1 Mts. Waimea, Kauai, at 4000 feet, in May. Varies much in colouring.

(2) *Nesamiptis obsoleta* Butl.

Hypena obsoleta Butl. Ent. Mo. Mag. XIV. p. 47; ib. XVII. p. 9; id. Ann. Mag. N. H. (5) VII. 1881, p. 324. *Hypena insignis* Butl. Ent. Mo. Mag. XIV. p. 48; ib. XVII. p. 9.

♂♀. 22—30 mm. (one exceptional specimen 34 mm.). Head and thorax fuscous or brown, more or less irrorated with whitish. Antennae in ♂ shortly and evenly ciliated, setae moderate. Forewings brown or fuscous, sometimes ferruginous-tinged, variably irrorated with whitish and strigulated with dark fuscous; first and second lines whitish or whitish-ochreous or yellow-ochreous or obsolete, first strongly and evenly curved, second slightly irregular, sinuate inwards on lower half, included median band sometimes partly blackish-edged, or wholly suffused with dark fuscous, or with a discal blotch or whole dorsal half blackish; reniform sometimes indicated by a dark fuscous transverse mark; usually a darker praesubterminal suffusion, marked on costal half with a series of dark fuscous spots, sometimes obsolete; usually an oblique darker shade from apex, preceded by a pale suffusion. Hindwings dark grey; a darker discal dot. (Plate III. figs. 2, 2 *a*—2 *g*.)

130 specimens; 29 Kona, Hawaii, at 2000—4000 feet; 6 Olaa, Hawaii, at 2000 feet; 1 Mts. Waimea, Kauai, at 4000 feet; 11 Kaholuamano, Kauai; 31 Waianae Mts., Oahu, at 1500—1700 feet; 19 Waialua, Koolau range, Oahu; 3 Kaala Mts., Oahu; 29 Lanai, at 2000 feet; 1 Molokai, at 4000 feet; from February to May, in July, and from September to November. Also several specimens in British Museum collection. Mr Blackburn records the species from Maui, as well as other islands. Exceedingly variable in colour and intensity of marking.

COSMOPHILA *Boisd.*

Head loosely scaled, with short frontal tuft. Antennae in ♂ ciliated, with longer setae on each joint. Palpi rather long, curved, ascending, second joint thickened with dense appressed scales, terminal rather long, cylindrical, obtusely pointed. Thorax with posterior crest. Abdomen without crest. Tibiae with appressed scales. Hindwings: 5 nearly parallel to 4.

Subbasal line black, triangular ....(*1*) *noctivolans.*
„ not black ....(*2*) *sabulifera.*

(1) *Cosmophila noctivolans* Butl.

Toxocampa noctivolans Butl. Ent. Mo. Mag. XVII. p. 8.

♂♀. 28—33 mm. Head and thorax varying from fuscous-whitish or whitish-ochreous to reddish-ochreous or dark fuscous. Forewings with termen obtusely projecting on vein 4; varying from pale ochreous to rather dark fuscous, usually more or less reddish-tinged, sometimes partially whitish-suffused, often darker-strigulated; subbasal line forming a triangular black mark (rarely unicolorous), pale-edged, its anterior edge being straight and posterior edge acutely angulated; first and second lines slender, pale or whitish, included median band sometimes wholly suffused with dark fuscous, usually more or less black-marked on edges, anterior edge strongly concave, with a strong acute projection above dorsum, posterior edge indented immediately beneath costa, below this with a short rectangular projection, and a similar one in middle, lower half curved inwards; orbicular represented by a minute white dot; lower edge of reniform usually indicated by a whitish dot, sometimes upper edge also marked by a similar dot; a more or less distinct praesubterminal series of cloudy darker spots, interrupted above middle; subterminal line seldom distinctly pale, irregularly dentate. Hindwings rather dark grey. (Plate IV. fig. 16.)

23 specimens; 14 Kaholuamano, Kauai; 5 Mts. Waimea, Kauai, at 4000 feet; 1 Wailuku, Maui; 3 Waianae Mts., Oahu, at 2000 feet; from April to June. Also one specimen in British Museum, taken by Mr Blackburn on Haleakala, Maui, at 4000 feet. Varies considerably in colour and intensity.

(2) *Cosmophila sabulifera* Guen.

Gonitis sabulifera Guen. Noct. VI. 404; *G. hawaiensis* Butl. Trans. Ent. Soc. Lond. 1882, 32.

Varies from light brownish or reddish-ochreous to dark brown; in one specimen the median band is wholly deep red-brown mixed with black. Besides the different character of the subbasal line, the species differs from *C. noctivolans* in the different form of the first and second lines, and the larger size.

15 specimens; 4 Olaa, Hawaii, at 2000 feet, in November; 4 Kaholuamano,

Kauai, in April; 6 Mts. Waimea, Kauai, at 4000 feet, in May and June; 1 Panoa Valley, Oahu. Also several specimens received from Mr Blackburn, who took the species near Honolulu, Oahu. Occurs likewise in Fiji, S. Asia, and Africa.

HYPOCALA *Guen.*

(1) *Hypocala andremona* Cram.

Hypocala velans Walk. Cat. XIII. 1177.

2 specimens; 1 Kona, Hawaii, at 1500 feet, in August; 1 Kaala Mts., Oahu, at 500 feet, in January: the former an example of the dark suffused variety indicated by Walker under the name *velans*, the latter quite normal. Other examples taken by Mr Blackburn, near Honolulu, Oahu, and on Maui. Occurs also in the warmer regions of America. I regard the form *velans* as a native race (Mr Perkins thinks he once saw it flying commonly without the type), and typical specimens as recent immigrants.

PLUSIA *Ochs.*

(1) *Plusia biloba* Steph.

3 specimens; 2 Kona, Hawaii, at 4000 feet, in July; 1 Haleakala, Maui, at 5000 feet, in March; and a single forewing from Lanai, at 2000 feet, in January. Occurs also in the warmer parts of America, from Florida to Peru.

(2) *Plusia chalcites* Esp. (*verticillata* Guen.).

11 specimens; 3 Kona, Hawaii, at 1400—3000 feet; 4 Olaa, Hawaii, at 2000 feet; 3 Waianae Mts., Oahu; 1 Lanai, at 2000 feet; in February, April, June, and from September to December. Occurs also in New Zealand, Australia, S. Asia, S. Europe, and Africa.

NOTODONTINA.

HYDRIOMENIDAE.

EUCYMATOGE *Hüb.*

Face with short cone of scales. Antennae in ♂ ciliated. Palpi rough-scaled. Abdomen crested throughout. Forewings: areole double. Hindwings: 8 anastomosing with cell to beyond middle.

1. Groundcolour green ....2.
,, not green ....3.

2. Forewings with discal dot obscured in striation, termen subsinuate ....(*8*) *orichloris.*
,, ,, conspicuous, termen not sinuate ....(*7*) *prasinombra.*
3. Hindwings with termen nearly straight, subdentate ....(*4*) *staurophragma.*
,, ,, strongly but often unevenly rounded........................4.
4. Face and palpi partly or wholly dull crimson ....5.
,, ,, not crimson ....6.
5. Groundcolour white ....(*5*) *niphoreas.*
,, light dull crimson ....(*6*) *rhodopyra.*
6. Abdomen with subbasal reddish band ....7.
,, without reddish band ....8.
7. Forewings with discal spot conspicuous..(*9*) *craterias.*
,, ,, obsolete ... .(*3*) *dryinombra.*
8. Wings more or less whitish-striated ....(*10*) *monticolans.*
,, not whitish-striated ....9.
9. Wings dark fuscous ....(*1*) *phaeocausta.*
,, dark grey, black-marked ....(*2*) *scoriodes.*

(1) *Eucymatoge phaeocausta,* sp. nov.

♂♀. 15—17 mm. Head, thorax, and abdomen dark fuscous, with a few pale ochreous-yellowish scales, sides of face with a fine oblique pale ochreous-yellowish line. Forewings elongate-triangular, termen very obliquely bowed; dark fuscous, thinly irregularly sprinkled with pale ochreous-yellowish, with indistinct darker striae angulated above middle; margins of median band indicated by more marked pale irroration, especially in ♀. Hindwings with termen rounded, waved; dark fuscous, in ♀ with a few pale ochreous-yellowish scales; a postmedian series of minute white dots on veins, in ♂ partially obsolete.

2 specimens, Molokai; ♂ above 4000 feet, in June, ♀ in forest above Pelekunu, in August.

(2) *Eucymatoge scoriodes,* sp. nov.

♂. 15—17 mm. Head, thorax, and abdomen blackish, face with a few ochreous scales, thorax and abdomen sprinkled with whitish, abdomen with a black subbasal band. Forewings rather elongate-triangular, termen obliquely bowed; dark grey, more or less thinly sprinkled with pale greyish-ochreous, with indistinct black striae more or less accompanied by whitish scales on veins; edges of median band more strongly black-marked, posterior rounded-prominent above middle, a median stria sharply angulated near costa; in one specimen an elongate pale yellow-ochreous spot in middle of disc. Hindwings with termen unevenly rounded, waved; dark grey, with striae and whitish scales as in forewings, but less marked. (Plate IV. fig. 7.)

4 specimens, Haleakala, Maui, at 7000—8000 feet, in May.

(3) *Eucymatoge dryinombra*, sp. nov.

♂♀. 16—20 mm. Head, thorax, and abdomen brownish-ochreous, with a few dots of dark fuscous scales, or sometimes suffusedly irrorated with dark fuscous, abdomen with fuscous-reddish subbasal band black-marked on sides. Forewings elongate-triangular, termen very obliquely bowed; light brownish-ochreous, sometimes irrorated with fuscous or dark fuscous, with faintly indicated darker striae; second and fifth fasciae and sometimes whole dorsal area suffused with dull crimson irroration; edges of median band irregularly marked with dark fuscous on veins, forming small spots on costa, posterior irregularly curved-prominent, sometimes accompanied by whitish dots; subterminal line obscurely ochreous-whitish, most distinct in middle. Hindwings with termen rounded, unevenly subdentate; as forewings, but less strongly marked.

5 specimens; 4 Molokai, at 4000—4500 feet; 1 Olaa, Hawaii, darker throughout than the others; in July and September.

(4) *Eucymatoge staurophragma*, sp. nov.

♂♀. 21—26 mm. Head and thorax pale ochreous, face sometimes suffused with dull reddish, with two small blackish spots before antennae, palpi blackish. Abdomen whitish-ochreous, sometimes reddish-mixed, especially in ♀, usually with a black-reddish subbasal band, in ♂ with dorsal and sometimes lateral series of blackish dots and subapical ring. Forewings rather elongate-triangular, termen very obliquely bowed; pale ochreous or whitish-ochreous, sometimes partially or wholly suffused with dull reddish irroration; a subbasal stria indicated by two or three blackish dots; median band in one ♀ wholly suffused with dull reddish mixed with blackish, sharply contrasted with pale ground-colour, in others only margins indicated by series of black marks on veins, sometimes accompanied by minute white dots, posterior almost evenly curved, somewhat indented beneath costa; sometimes an obscure darker discal dot; sometimes a few white scales on veins in disc; subterminal line faintly pale or whitish, preceded above middle by two spots of dull reddish or blackish suffusion. Hindwings with apex prominent, termen nearly straight, subdentate; colour and markings much as in forewings, but less marked towards base. (Plate IV. fig. 18.)

9 specimens; 1 Kona, Hawaii, above 2000 feet, in September; 1 Kilauea, Hawaii, in August; 5 Olaa, Hawaii, in June, November and December; 2 Haleakala, Maui, at 5000 feet, in May. The species seems variable, but may be easily distinguished from all others by the peculiarly formed hindwings.

(5) *Eucymatoge niphoreas*, sp. nov.

♂. 16 mm. Head and thorax white, face and palpi black mixed with deep crimson. Abdomen whitish mixed with dark grey, partially suffused with brownish-ochreous except towards base and apex, with a subbasal band of dull crimson suffusion. Forewings somewhat elongate-triangular, termen bowed, oblique; white, with undefined striae of grey and black irroration, partly crimson on dorsum; small costal blotches at $\frac{1}{4}$ and $\frac{1}{2}$, and a costal streak connecting former with base black mixed with crimson; a black transverse discal dot; posterior edge of median band formed by a fine interrupted blackish stria, angulated in middle, dentate on lower half, shortly followed by a parallel black stria, much stronger on upper half, especially on costa, and somewhat more curved; subterminal line dentate, whitish, margined with dull crimson shades, more broadly and deeply on upper half anteriorly, interrupted in middle. Hindwings with termen rounded; white, with well-defined black striae, mixed with crimson in disc; posterior edge of median band more strongly marked, obtusely angulated in middle; discal dot and subterminal line as in forewings, but less marked. (Plate IV. fig. 19.)

1 specimen, Kauai, at 4000 feet, in July.

(6) *Eucymatoge rhodopyra*, sp. nov.

♀. 23 mm. Head and palpi dull crimson. Thorax and abdomen fuscous tinged with dull crimson. Forewings triangular, termen sinuate beneath prominent apex, strongly bowed, oblique; light dull rosy-crimson, irrorated with fuscous, forming obscure darker striae; a dark fuscous transverse discal dot; posterior edge of median band dark fuscous, pale-edged posteriorly, especially on upper half, running from $\frac{2}{5}$ of costa straight and obliquely outwards half across wing, where it is acutely angulated, thence to dorsum forming an obtuse angle inwards. Hindwings with termen rounded; colour and markings as in forewings, but less pronounced. (Plate IV. fig. 20.)

1 specimen, Kauai, at 4000 feet, in October.

(7) *Eucymatoge prasinombra*, sp. nov.

♀. 22 mm. Head, thorax, and abdomen light dull green, face with two black dots before antennae, abdomen with some black scales. Forewings rather elongate-triangular, termen obliquely bowed; light dull green, with numerous undefined striae of black and fuscous scales; a moderate transverse-oval black discal dot. Hindwings with termen unevenly rounded, slightly waved; colour and markings as in forewings.

1 specimen, Haleakala, Maui, at 5000 feet, in May.

(8) *Eucymatoge orichloris*, sp. nov.

♂♀. 21—24 mm. Head, thorax, and abdomen dull light yellowish-green, face with two black dots before antennae, collar spotted with blackish, thorax with transverse band of blackish suffusion, abdomen with an interrupted blackish subbasal band, and lateral series of black dots. Forewings rather elongate-triangular, termen slightly sinuate beneath apex, very obliquely bowed; dull light yellowish-green, with numerous blackish striae; edges of median band more strongly blackish-marked, posterior obscurely whitish-edged, rounded-prominent beneath costa and in middle; a small indistinct blackish discal dot, obscured in striation; subterminal line pale, preceded by a double suffused blackish spot above middle, above and below which are light patches. Hindwings with termen rounded, waved; colour and markings as in forewings. (Plate IV. fig. 21.)

12 specimens; 10 Olaa, Hawaii, at 2000 feet, in June and September; 1 Hilo, Hawaii, at 2000 feet, in December; 1 Lanai, at 2000 feet, in January.

(9) *Eucymatoge craterias*, sp. nov.

♂♀. 15—21 mm. Head, thorax, and abdomen fuscous mixed with dark fuscous and whitish-ochreous, face with sides or sometimes wholly ochreous-whitish, abdomen with ferruginous-reddish subbasal band mixed with black, apical segment in ♂ suffused with whitish. Forewings rather elongate-triangular, costa posteriorly moderately arched, termen obliquely rounded; whitish-ochreous, suffusedly irrorated with fuscous, obscurely striated with dark fuscous; basal area as far as median band more or less obscurely striated with whitish; edges of median band blackish-marked, strongly curved, posterior obtusely prominent beneath costa and in middle; a conspicuous black transverse discal dot; median band margined posteriorly by a strong white stria, followed by a whitish-ochreous stria, from which two obscurely pale or conspicuously whitish longitudinal patches extend to termen, one near beneath costa, the other in middle; in one specimen the lower half of the two postmedian striae forms a whitish blotch reaching to near termen; subterminal line sometimes distinctly whitish, sometimes preceded by a reddish tinge. Hindwings with termen unevenly rounded, waved; colour and markings as in forewings, but median band whitish-striated, the pale longitudinal posterior patches obsolete.

29 specimens; 15 Haleakala, Maui, at 5000 feet, in May; 12 Kona, Hawaii, at 3500—4000 feet, from June to August; 1 Olaa, Hawaii, in June; 1 Kilauea, Hawaii, in July. All the specimens from Hawaii are smaller, and have the pale markings, especially the longitudinal posterior patches, more conspicuous than in those from Maui,

in none of which are these latter at all prominent; the form from Hawaii is sufficiently distinct in appearance to rank as a geographical variety, which may be named *ditrecta.* The costa of the forewings is more arched than in the following species, and the anterior edge of median band more strongly curved.

(10) *Eucymatoge monticolans* Butl.

Eupithecia monticolens Butl. Ann. Mag. Nat. Hist. (5) VII., 1881, p. 320.

♂♀. 19—29 mm. Head, thorax, and abdomen white, sometimes ochreous-tinged, sometimes variously spotted or mixed with dark fuscous, abdomen sometimes with brown or black subbasal ring and dorsal and lateral series of spots. Forewings rather elongate-triangular, costa hardly arched, termen obliquely rounded; white or fuscous-whitish, sometimes fuscous-suffused or irrorated with dark fuscous or black, with numerous more or less distinct dark fuscous or blackish striae, which are sometimes partly suffused with ferruginous-brown; edges of median band more strongly black-marked, anterior gently curved, posterior very slightly prominent near costa and rather strongly rounded-prominent in middle, usually followed by two more distinctly whitish striae; discal spot roundish, black, large or dotlike or often wholly absent, in one dark specimen white; praesubterminal stria often more strongly black-marked, especially on two spots above middle, opposite which are also often two postsubterminal similar spots. Hindwings with termen rounded, waved; colour and markings as in forewings, but usually more uniformly and less distinctly striated, or striae sometimes nearly obsolete, not black-marked except on dorsum, discal dot indistinct or absent. (Plate III. figs. 3, 3*a*—3*i*.)

130 specimens; 13 Kona, Hawaii, at 3000—4000 feet; 5 Kilauea, Hawaii; 21 Olaa, Hawaii; 1 Hilo, Hawaii, at 2000 feet; 15 Haleakala, Maui, at 2000—9000 feet; 2 Lahaina, Maui, at 3000 feet; 8 Lanai, at 2000—2500 feet; 20 Molokai, at 3000—4000 feet; 29 Kaholuamano, Kauai, at 4000 feet; 16 Waimea Mts., Kauai, at 4000 feet; apparently therefore generally distributed throughout the group, and is on the wing all the year round. It is an extraordinarily variable species, yet easy of recognition, and shows no distinguishable geographical forms, but the largest and most striking specimens are from Maui, those from Molokai are rather small and uniform in appearance, those from Lanai are also small and darker or more brownish-tinged. I have modified for orthographical reasons Butler's specific name.

HYDRIOMENA *Hüb.*

Face with conical tuft of scales. Antennae in ♂ ciliated. Palpi rough-scaled. Abdomen not crested. Forewings: areole double. Hindwings: 8 anastomosing with cell to beyond middle.

(1) *Hydriomena aphoristis*, sp. nov.

♂. 23—25 mm. Head, thorax, and abdomen dark fuscous, margins of abdominal segments sometimes finely whitish. Forewings triangular, costa posteriorly arched, termen obliquely rounded, waved; dark fuscous; a whitish-ochreous dot on costa at $\frac{1}{4}$; median band limited by fine irregular whitish striae, forming stronger whitish-ochreous marks on costa, anterior nearly preceded and posterior nearly followed by very obscure yellow-ochreous striae; subterminal line fine, irregular, whitish, sometimes partially obsolete, forming a stronger mark on costa. Hindwings with termen waved; dark fuscous; traces of a fine whitish subterminal line. (Plate IV. fig. 22.)

2 specimens, Kilauea, Hawaii, in July and September.

XANTHORHOE *Hüb.*

Face with conical tuft of scales. Antennae in ♂ bipectinated, apex simple. Palpi rough-scaled. Forewings: areole double. Hindwings: 8 anastomosing with cell to beyond middle.

1. Forewings orange ....(*1*) *ioxantha.*
    „ not orange ....2.
2. Hindwings with termen dentate ....(*4*) *caustoscia.*
    „ „ hardly waved ....3.
3. Forewings with dark fuscous or blackish striae ....(*2*) *insularis.*
    „ ferruginous-ochreous striae ....(*3*) *leucoxyla.*

(1) *Xanthorhoe ioxantha*, sp. nov.

♀. 30 mm. Head and thorax bright orange. Abdomen orange, segmental margins purplish. Forewings rather elongate-triangular, apex somewhat produced, termen oblique, slightly rounded, faintly sinuate beneath apex; bright orange; basal area ferruginous-mixed, with an angulated stria of blackish irroration at $\frac{1}{6}$; edges of median band formed by fasciae of two or three subconfluent blackish striae suffused with ferruginous, two interior ferruginous striae meeting near costa, posterior edge dentate, with two stronger projections below middle; a small round blackish discal spot; a ferruginous suffusion towards termen except near costa, enclosing a terminal series of undefined subconfluent blackish-grey terminal spots. Hindwings elongate, termen strongly rounded; yellow-whitish, dorsal half obscurely yellow-suffused; a black discal dot; a dark grey postmedian transverse shade, thickest dorsally, angulated in middle; a dark grey terminal suffusion, towards dorsum anteriorly suffused with ferruginous. (Plate IV. fig. 23.)

1 specimen, Kaholuamano, Kauai, at 4000 feet, in April.

(2) *Xanthorhoe insularis* Butl.

Larentia insularis Butl. Ent. Mo. Mag. xv. p. 272.

♂, 30 mm.; ♀, 25—26 mm. Head, thorax, and abdomen white, mixed with dark fuscous, in ♂ more densely, abdomen with double dorsal series of black spots. Antennal pectinations of ♂ very short, tooth-like, terminating in fascicles of cilia. Forewings rather elongate-triangular, termen hardly rounded, very oblique; white, with indistinct striae of fuscous and black irroration, in ♂ largely suffused with fuscous and densely irrorated with dark fuscous; basal patch of four slightly curved striae, in ♂ dark fuscous, in ♀ blackish; median band formed of seven or eight striae, in ♂ dark fuscous, in ♀ blackish, anterior edge curved, somewhat indented below middle, posterior irregular, middle third forming an angular prominence; an inconspicuous black transverse discal dot; a more or less interrupted or obsolete blackish praesubterminal stria; a terminal blackish line interrupted to form numerous spots. Hindwings elongate, termen rounded, hardly waved; whitish, with numerous indistinct striae, in ♂ light fuscous, in ♀ grey.

2 ♀s, Haleakala, Maui, at 6000—8000 feet, above forest level, in May; Mr Perkins did not obtain a ♂, and I have therefore described one received from Mr Blackburn, taken in the same locality, and quite similar to the type specimen in the British Museum. The sexes are dissimilar in appearance, the ♂ being larger, greyer, and more obscure, the ♀ whiter and more sharply marked, but I think there is no doubt of their identity.

(3) *Xanthorhoe leucoxyla*, sp. nov.

♀. 34 mm. Head, thorax, and abdomen ochreous-whitish mixed with pale ochreous, abdomen with double dorsal series of suffused ferruginous-ochreous spots. Forewings somewhat elongate-triangular, termen gently rounded, oblique; ochreous-whitish, with indistinct ferruginous-ochreous striae; basal patch of four slightly curved suffused darker striae, costal edge dull crimson near base; median band of about six similar striae, anterior edge acutely indented beneath costa, posterior with middle third forming an angular prominence; a round black discal dot; subterminal line forming a series of small indistinct white spots, one at $\frac{1}{4}$ from costa preceded by a small round blackish spot. Hindwings elongate, termen rounded, hardly waved; ochreous-whitish; a median band of several faint fuscous striae. (Plate IV. fig. 24.)

1 specimen, Waimea Mts., Kauai, at 4000 feet, in May.

(4) *Xanthorhoe caustoscia*, sp. nov.

♂♀. 39—42 mm. Head, thorax, and abdomen dark fuscous, somewhat whitish-sprinkled, in ♂ with a ferruginous spot between antennae, abdomen in ♂ mixed with dull crimson, especially towards base; thorax with well-developed central and posterior crests; antennal pectinations in ♂ rather long. Forewings somewhat elongate-triangular, termen rounded, oblique, strongly waved; fuscous, faintly reddish or purplish-tinged, with numerous waved dark fuscous striae; a somewhat darker basal patch, edge slightly curved; median band darker-suffused towards edges, anterior edge slightly curved, posterior edge somewhat rounded-prominent beneath costa and on middle third; subterminal line pale, interrupted, in ♀ forming several whitish dots, of which one in middle is conspicuous, edged anteriorly with darker spots. Hindwings with termen rounded, dentate; fuscous; a median band of several darker striae, very faint except towards dorsum; subterminal line similarly indicated.

2 specimens; 1 ♂ Haleakala, Maui, at 5000 feet, in May; 1 ♀ Lanai, at 3000 feet, in July.

PROGONOSTOLA, gen. nov.

Face with conical scale-projection. Antennae in ♂ unipectinated, towards apex simple. Palpi rough-scaled. Forewings: areole double. Hindwings: 6 and 7 stalked, 8 anastomosing with cell to beyond middle.

Allied to *Xanthorhoe*, but differs from it and all other near members of the family in the uniseriate pectinations of the antennae of ♂.

(1) *Progonostola cremnopis*, sp. nov.

♂♀. 30—36 mm. Head, thorax, and abdomen dark fuscous, somewhat pale-sprinkled; thorax with developed central and posterior crests. Forewings somewhat elongate-triangular, termen slightly rounded, oblique, strongly waved; fuscous, purplish-tinged, with numerous waved dark fuscous striae; median band preceded by two undefined obscure whitish-ochreous striae; a small transverse blackish-fuscous discal spot, followed by a stronger dark stria, beyond which is a more or less obscure whitish-ochreous wedge-shaped median suffusion; posterior edge of median band marked by a stronger dark stria, somewhat prominent beneath costa, and with middle third forming a short obtuse bilobed prominence, on costa followed by one or two whitish-ochreous strigulae; subterminal line faintly indicated with whitish-ochreous, only distinct on costa. Hindwings with termen rounded, dentate; fuscous, with indistinct darker waved striae, edges of median band more strongly marked; subterminal line faintly whitish-ochreous. (Plate IV. fig. 25.)

14 specimens; 9 Olaa, Hawaii; 5 Molokai, at 3000 feet; in June, September, and November.

DASYURIS *Guen.*

Face rough-haired. Antennae in ♂ shortly ciliated. Palpi with long dense rough hairs. Thorax and coxae densely hairy beneath. Forewings: areole double. Hindwings: 6 and 7 stalked, 8 anastomosing with cell to beyond middle.

(1) *Dasyuris holombra*, sp. nov.

♂. 36—37 mm. Head, palpi, and thorax dark fuscous, thinly and finely whitish-sprinkled. Forewings broad-triangular, termen rounded, somewhat oblique; dark fuscous, ferruginous-tinged, with indistinct darker striae; median band more strongly dark-edged, limited by fine obscure striae of whitish irroration, posterior edge with moderate bilobed median prominence; a transverse blackish-fuscous median dot; subterminal line fine, obscure, formed of whitish irroration. Hindwings with termen rounded; dark ferruginous-fuscous; in one specimen a few whitish scales at tornus. (Plate IV. fig. 26.)

2 specimens, Haleakala, Maui, at 5000 feet, in April and May.

SELIDOSEMIDAE.

SISYROPHYTA, gen. nov.

Face with tuft of scales. Tongue developed. Antennae in ♂ bipectinated, simple towards base and on apical third. Palpi rough-scaled. Thorax hairy beneath. Abdomen in ♂ elongate, hairy beneath. Femora glabrous, posterior tibiae in ♂ elongate, dilated, containing hair-pencil in groove, posterior tarsi in ♂ reduced. Forewings in ♂ without fovea, more or less distorted, above with longitudinal supramedian groove, beneath more or less largely clothed with dense rough hairs; 10 sometimes out of 9, sometimes connected with 9, 11 sometimes out of 10 near base, sometimes running into or anastomosing with 12. Hindwings in ♂ above with median groove or streak of erect hairs.

Remarkable for the curiously developed secondary sexual characters of the ♂. The two species have much general similarity; the ♂s are obviously distinguished by the differences in these secondary sexual developments; the ♀s may be separated by the difference in size and neuration. Type *S. gomphias*.

(1) *Sisyrophyta gomphias*, sp. nov.

♂♀. 50—58 mm. Head and thorax brown. Abdomen pale brownish-ochreous. Forewings elongate-triangular, in ♂ with apex and upper part of termen curved over beneath so as to appear strongly rounded off, hardly oblique, in ♀ termen bowed, oblique; in ♂ above with deep compressed supramedian groove, beneath with costal half clothed with very dense rough hair-scales; 11 out of 10 near base, running into or anastomosing with 12; brownish-ochreous or ochreous-fuscous, sometimes sprinkled with dark fuscous; first and second lines of blackish-fuscous dots, usually much approximated dorsally, lowest one of each sometimes confluent, first of three dots, curved, second of seven or eight dots, in ♂ strongly curved in disc, in ♀ somewhat bent below middle; a terminal series of blackish-fuscous dots. Hindwings with termen rounded, in ♂ with compressed longitudinal median groove; brownish-ochreous, paler basally, more fuscous-tinged posteriorly; sometimes a curved postmedian series of indistinct fuscous dots; cilia ochreous-whitish. (Plate IV. fig. 27.)

38 specimens; 34 Olaa, Hawaii, at 2000 feet; 3 Kona, Hawaii, at 2000—3000 feet; 1 Molokai, at 3500 feet; in June, September, November, and December.

(2) *Sisyrophyta ochetias*, sp. nov.

♂♀. 40—48 mm. Head and thorax brown. Abdomen light brownish-ochreous. Forewings elongate-triangular, narrower than in *S. gomphias*, in ♂ with apex, termen, and dorsum strongly and continuously rounded, in ♀ with termen bowed, oblique; in ♂ above with irregular supramedian groove, beneath with median longitudinal fringe of long erect hairs, dorsal half below this wholly clothed with modified furry scales, with a marginal ridge of dense raised scales, costal area partially hairy; 10 sometimes out of 9, sometimes connected with 9, 11 separate; brownish-ochreous or ochreous-fuscous, more or less sprinkled with dark fuscous; first and second lines of blackish-fuscous dots, moderately approximated dorsally, first of three dots, hardly curved, second of seven or eight dots, in ♂ rather strongly curved in disc, in ♀ somewhat curved, sinuate inwards above middle; no terminal dots. Hindwings with termen rounded, in ♂ unevenly; in ♂ above with a median longitudinal streak-like patch of fine long erect hairs from near base to beyond middle, termen partially narrowly folded over, distorted; in ♂ pale ochreous, disc suffused with rather dark grey; in ♀ pale brownish-ochreous irrorated with fuscous.

16 specimens; 15 Olaa, Hawaii, at 2000 feet; 1 Hilo, Hawaii, at 2000 feet; in June, September, November, and December.

SCOTORYTHRA *Butl.*

Face with tuft of scales. Tongue developed. Antennae in ♂ bipectinated, simple towards base (on 4 or 5 joints above basal) and on apical third. Palpi rough-scaled. Thorax hairy beneath. Femora sometimes hairy beneath, posterior tibiae in ♂ more or less dilated, containing hair-pencil in groove, posterior tarsi in ♂ often reduced. Forewings in ♂ without fovea; 10 often connected with 9, 11 rarely out of 10 very near base, rarely absent, sometimes anastomosing with 12. Hindwings normal.

Type *S. arboricolans* Butl. This genus is endemic; the species are exceedingly puzzling, owing to their number, similarity, and similar variability. In the males the secondary sexual characters, such as the length of the abdomen (measured in terms of the breadth of the hindwings), the length of the antennal pectinations (estimated in terms of the breadth of the stalk), and the structure of the posterior legs (the tarsi being measured in terms of the length of the tibia), often afford valuable aid in their discrimination; but the females of allied species are often excessively similar.

In the neuration of the forewings, the origin of 11 out of 10 very near base, or its entire absence, appear to be individual abnormalities, which I have observed only in one instance of each, of no specific importance; the connection of 10 with 9 is frequent, but (as in *Selidosema* and allied genera) is also of no importance; the anastomosing of 11 with 12 however is worthy of attention, as I have found it in some specimens of all the first eight species (except *corticea*, not examined), even in the three monotypic ones, it being most constant in *isospora*, whilst I have noticed no instance of it in the rest; it therefore helps to confirm the grouping of these species together, though too inconstant to define them; these eight species are however distinguished from all the rest by the form of the second line.

In the following tabulation the scheme is double from the eighteenth heading onwards, the sexes being thereafter tabulated separately; this was unavoidable, owing to the divergence of the sexes in these species; the discrimination of the males is then rendered comparatively easy by the use of the secondary sexual characters; that of the females is and must remain difficult, the differences between them being extremely slight, and the individual variability very considerable.

1. Apex of forewings subfalcate; expanse over 80 mm. (♀ only known) ......(*30*) *megalophylla*.
" " at most somewhat prominent; expanse under 76 mm. ....2.
2. Postmedian line of hindwings well-defined, slender, entire ....3.
" " dotted or cloudy or obsolete ....5.
3. Forewings ochreous ....(*14*) *demetrias*.
" not ochreous ....4.
4. First line of forewings acutely angulated above middle ....(*17*) *oxyphractis*.
" " almost straight ....(*16*) *ortharcha*.

5. Second line of forewings not sinuate inwards above middle ....6.
„ „ more or less distinctly sinuate inwards above middle..15.

6. Expanse 46 mm. or more; median shade usually obsolete ....7.
„ 43 mm. or less; median shade distinct ....8.

7. Forewings with termen slightly waved ....(*28*) *euryphaea.*
„ „ in ♂ moderately waved, in ♀ dentate ....(*29*) *hyparcha.*

8. First line nearly approximated to median ....(*4*) *epicyma.*
„ remote from median ....9.

9. Discal spot of forewings very long-transverse, dark, conspicuous............(*1*) *syngonopa.*
„ „ oval, indistinct or obsolete ....10.

10. Discal spot annular ....(*2*) *arboricolans.*
„ not annular ....11.

11. Second line of forewings slightly curved; expanse 42 mm. ....(*8*) *homotrias.*
„ „ moderately curved; expanse not over 38 mm. ....12.

12. Second line of forewings nearly approximated to median on dorsal third (Oahu species) ....(*3*) *caryopis.*
„ „ not markedly approximated to median ....13.

13. Forewings with discal dot separate (Maui species) ....(*5*) *corticea.*
„ „ absorbed or obsolete ....14.

14. Hindwings with termen waved (Hawaii species) ....(*7*) *aruraea.*
„ „ dentate (Kauai species)...............................(*6*) *isospora.*

15. First line of forewings bent or angulated in middle ....16.
„ „ „ above middle ....17.

16. Forewings whitish-ochreous, median line well-marked ....(*11*) *anagraptis.*
„ fuscous or brownish-ochreous, median line absent ....(*10*) *trapezias.*

17. Apex of forewings distinctly prominent ....(*15*) *goniastis.*
„ „ not prominent ....18.

A. MALES (*9 hecataea*, and *20 platycapna* unknown).

18. Forewings with glandular patch of modified whitish-ochreous scales beneath in cell ....(*22*) *trachyopis.*
„ without such patch..19.

19. Antennal pectinations irregularly blotched with dark fuscous........................20.
„ „ evenly dark-lined..23.

20. Abdomen $1\frac{1}{3}$—$1\frac{1}{2}$ ....21.
„ almost 2 ....(*23*) *macrosoma.*

21. Discal spot of forewings whitish ....(*21*) *nephelosticta.*
„ „ not whitish ....22.

22. Forewings fuscous or dark fuscous; posterior tarsi $\frac{4}{5}$ ....(*19*) *capnopa.*
„ ochreous-fuscous, reddish-tinged; posterior tarsi $\frac{3}{5}$...............(*18*) *triscia.*

23. Abdomen 1—$1\frac{1}{4}$..24.
„ $1\frac{1}{2}$ ....25.

24. Forewings light fuscous, discal spot broader, roundish ....(*12*) *idolias.*
„ brownish-ochreous or fuscous, sometimes ferruginous-tinged, discal spot narrower, lunate ....(*13*) *paludicola.*

25. Forewings with apical spot of pale suffusion..26.
„ without such spot ....27.

26. Forewings with dorsal edge and terminal cilia clear pale yellowish ......(*25*) *artemidora.*
„ „ „ „ not pale ....(*24*) *pachyspila.*

27. Posterior tarsi ½ ....(26) *brachytarsa.*
,, ¾–⅘ ....(27) *rara.*

B. Females.

18. Forewings with discal spot broad, not lunate ....19.
,, ,, narrow, lunate ....21.
19. Discal spot roundish; expanse 33 mm. or less ....(*12*) *idolias.*
,, trapezoidal, dilated beneath; expanse 40 mm. or more ....20.
20. Forewings narrower, ferruginous-tinged ....(*22*) *trachyopis.*
,, less narrow, not ferruginous-tinged ....(*23*) *macrosoma.*
21. Median shade much broader than other lines, distinct ....(*9*) *hecataea.*
,, not or little broader, generally obsolete ....22.
22. Forewings with apical spot of pale suffusion ....23.
,, without such spot ....24.
23. Forewings with dorsal edge and terminal cilia clear pale yellowish ......(*25*) *artemidora.*
,, ,, ,, not pale ....(*24*) *pachyspila.*
24. First and second lines dark-dotted ....25.
,, ,, not dark-dotted ....28.
25. Termen of forewings gently waved ....26.
,, ,, moderately waved ....27.
26. Expanse 45 mm. or more ....(*27*) *rara.*
,, 44 mm. or less ....(*13*) *paludicola.*
27. Lines and discal spot usually strongly marked (Kauai species) ....(*21*) *nephelosticta.*
,, ,, rather obscurely marked (Hawaii species) ....(*26*) *brachytarsa.*
28. Head and thorax dark fuscous ....29.
,, ,, brown, somewhat reddish-tinged ....(*18*) *triscia.*
29. Forewings broader, lines obsolete ....(*20*) *platycapna.*
,, less broad, lines distinct ....(*19*) *capnopa.*

(1) *Scotorythra syngonopa*, sp. nov.

♂. 43 mm. Head and thorax light grey, patagia whitish towards tips. Antennae white, faintly greyish-ringed, pectinations 10, laterally black-lined. Abdomen 1½, grey, segmental margins white, anal tuft ochreous-whitish. Legs grey, posterior tibiae whitish mixed, dilated, enclosing a whitish hair-pencil, posterior tarsi ¾. Forewings somewhat elongate-triangular, termen rather obliquely rounded, faintly waved, dorsum more rounded than usual; light ochreous-grey, finely strigulated with rather dark fuscous; costa with some irregularly strewn ochreous-white strigulae; first, median, and second lines forming cloudy darker fuscous shades, first faint, curved, median faint, sinuate, towards dorsum more distinct and subconfluent with second, second posteriorly tolerably well-defined and partially obscurely pale-edged, waved, moderately curved outwards on upper ⅔ and inwards near dorsum; discal spot very long-transverse, cloudy, rather dark fuscous. Hindwings with termen waved; colour and markings as in forewings, but first line obsolete, second hardly curved inwards near dorsum, discal spot much smaller and less distinct. (Plate IV. fig. 28.)

1 specimen, Waimea Mts., Kauai, at 4000 feet, in May. Rather markedly distinct by its size, grey-striated appearance, more rounded dorsum of forewings, length of discal spot, and form of second line.

(2) *Scotorythra arboricolans* Butl.

Scotorythra arboricolens (prav. form.) Butl. Ent. Mo. Mag. XIX. p. 177.

♂♀. 27—35 mm. Head, thorax, and abdomen varying from light fuscous or grey to (in ♀) whitish-ochreous, abdomen in ♂ 1⅙—1¼, segmental margins white. Antennae whitish-grey or ochreous-whitish, darker-ringed, pectinations in ♂ 7—8, whitish, laterally black-lined. Legs grey, posterior tibiae whitish-mixed, in ♂ somewhat dilated, enclosing a whitish hair-pencil, posterior tarsi in ♂ ⅚ to almost 1. Forewings somewhat elongate-triangular, termen in ♂ faintly, in ♀ more distinctly sinuate beneath apex, bowed, rather oblique; in ♂ fuscous or grey, varying in depth, more or less densely strigulated with dark fuscous, in ♀ brownish-ochreous to ochreous-whitish, densely strigulated with fuscous; first and second lines indistinctly darker, obscurely dotted with blackish, second sometimes posteriorly pale-edged, in one ♀ first obsolete and second represented by a white streak, first slightly curved, second with upper ⅔ moderately curved or bent outwards; a transverse-oval discal spot indistinctly dark-outlined, sometimes traversed by a dark fuscous median shade; seldom a darker praesubterminal shade and subapical suffusion. Hindwings with termen waved; colour, discal spot, median shade, second line, and praesubterminal shade as in forewings.

12 specimens; 10 Kona, Hawaii, at 2000—4000 feet; 1 Kilauea, Hawaii; 1 Lanai, at 3000 feet; from July to September. Butler's type was from Lanai, and I have also two other specimens of Mr Blackburn's from the same locality. A very variable species, but easy of recognition; its comparatively small size, greyish colouring, outlined discal spot, and form of second line are its most prominent characters.

(3) *Scotorythra caryopis*, sp. nov.

♂, 24—26 mm.; ♀, 30 mm. Head, thorax, and abdomen in ♂ light reddish-ochreous, in ♀ whitish-ochreous, abdomen sprinkled with dark fuscous, in ♂ 1⅕. Antennae whitish-ochreous, fuscous-ringed, pectinations in ♂ 7, blackish-lined. Posterior tibiae in ♂ moderately dilated, enclosing a whitish-ochreous hair-pencil, posterior tarsi in ♂ ¾. Forewings rather elongate-triangular, termen slightly waved, bowed, rather oblique, in ♀ more oblique and somewhat sinuate beneath apex; in ♂

reddish-ochreous or reddish-ochreous-brown, strigulated with dark fuscous, in ♀ whitish-ochreous irrorated with dark fuscous; first line curved, in ♂ partially marked with dark fuscous, in ♀ with three dark fuscous dots; median more or less dark, curved outwards on upper half; a transverse-oval fuscous discal spot before median, sometimes obsolete; second line waved, in ♂ more or less dark-marked, in ♀ dotted with dark fuscous, curved outwards on upper $\frac{2}{3}$, nearly approximated to median on lower third, space between these sometimes suffused with dark fuscous in middle and on dorsum; subterminal faintly indicated; sometimes an oblique dark subapical streak. Hindwings with termen waved; colour and lines as in forewings, but first line obsolete, median and second not much approximated dorsally.

4 specimens; 3 near Honolulu, Oahu, at 2000 feet; 1 Pauoa Valley, Oahu, at 1500 feet; in March, April, and October. This species, *isospora*, *aruraea*, and probably *corticea*, are closely related together, and may be regarded as representative forms of a common stock, each being confined to a different island. This species is particularly distinguished by the dorsal approximation of the median and second lines of forewings; it is also the smallest in average size.

(4) *Scotorythra epicyma*, sp. nov.

♀. 43 mm. Head and thorax light ferruginous-brown. Antennae pale brownish-ochreous. Abdomen brownish-ochreous, sprinkled with dark fuscous. Forewings rather elongate-triangular, apex slightly prominent, termen somewhat bowed, little oblique; ferruginous-brown, slightly sprinkled with blackish; first, median, second, and praesubterminal thick cloudy dark fuscous shades, three former rather near together, first and second waved, hardly curved, not reaching costa, median and praesubterminal almost straight, entire, but latter faint at tornus; a cloudy dark fuscous terminal patch beneath apex. Hindwings with termen hardly waved; colour, median, second, and praesubterminal shades, connecting blotch, and subapical suffusion as in forewings.

1 specimen, Kaholuamano, Kauai, at 4000 feet, in April. Evidently allied to the *isospora* group, but distinguished from them all by the straighter lines, larger size, and hardly waved termen of hindwings; the dark suffusion of the markings is probably variable as in the allied species.

(5) *Scotorythra corticea* Butl.

Scotosia corticea Butl. Ann. Mag. N. H. (5) VII., 1881, p. 319; Ent. Mo. Mag. XIX. p. 177.

♀. 35 mm. Head, thorax, and abdomen brownish, segmental margins finely whitish. Antennae ochreous-whitish, hardly ringed. Forewings rather elongate-triangular, termen somewhat bowed, oblique; brown, strigulated with dark fuscous; first and second lines cloudy, fuscous, marked with dark fuscous dots on veins, first moderately curved towards costa, second curved outwards on upper $\frac{2}{3}$, rather sinuate inwards towards dorsum; median shade thick, rather dark fuscous, sinuate; an ill-defined dark discal dot before this; a cloudy rather dark fuscous praesubterminal shade. Hindwings with termen moderately waved; colour and markings as in forewings, but first line absent, median and second lines little curved, more cloudy, praesubterminal little marked.

Mr Perkins obtained no specimens of this form; I have described the type in the British Museum collection, from Haleakala, Maui, at 4000 feet. There should have been a second specimen in Mr Blackburn's collection, but it seems to have been lost. The type is a partially deformed female, but there is no doubt of its distinctness from all others except *S. aruraea*; from this it differs only by the more sinuate median and second lines of the forewings, and apparently separate (though little-defined) discal dot; as the two forms are from different islands, and the other most closely allied species are each apparently confined to a single island, I have thought it best (in the absence of the male of *corticea*) to keep them as separate species until further material is available.

(6) *Scotorythra isospora*, sp. nov.

♂♀. 26—36 mm. Head and thorax in ♂ brownish, sometimes pale-sprinkled, in ♀ light greyish-ochreous. Antennae whitish or ochreous-whitish, faintly fuscous-ringed, pectinations in ♂ 7—8, laterally blackish-lined. Abdomen in ♂ $1\frac{1}{4}$, brownish, sprinkled with dark fuscous, segmental margins and anal tuft ochreous-whitish, in ♀ pale greyish-ochreous sprinkled with dark fuscous. Legs in ♂ fuscous, posterior tibiae whitish-mixed, somewhat dilated, enclosing an ochreous-whitish hair-pencil, in ♀ ochreous-whitish sprinkled with dark fuscous, posterior tarsi in ♂ $\frac{3}{4}$. Forewings rather elongate-triangular, termen faintly sinuate beneath apex, bowed, oblique, waved, in ♀ more strongly; brownish-ochreous in ♂, light greyish-ochreous in ♀, more or less densely strigulated with dark fuscous; first and second lines cloudy, indistinct, darker, marked with dark fuscous or blackish dots on veins, first curved, second waved, moderately curved, slightly sinuate inwards near dorsum; median shade broader, cloudy, somewhat sinuate, in ♀ seldom also black-dotted on veins; no discal spot; in ♀ sometimes a more or less developed broad fuscous suffusion in disc posteriorly beneath median vein, extending obliquely upwards to termen beneath apex. Hindwings with termen dentate; colour and markings as in forewings, but first line obsolete.

28 specimens; 17 Kaholuamano, Kauai, at 4000 feet; 11 Waimea Mts., Kauai, at 4000 feet; from April to June. Differs from its nearest allies by the dentate termen of hindwings, usually also by the paler colouring and more conspicuously dotted lines.

(7) *Scotorythra aruraea*, sp. nov.

♂♀. 31—38 mm. Head and thorax in ♂ brownish, in ♀ light brownish-ochreous. Antennae whitish-ochreous, fuscous-ringed, pectinations in ♂ 8—9, laterally blackish-lined. Abdomen in ♂ 1¼, brownish, segmental margins ochreous-whitish, in ♀ whitish-ochreous sprinkled with dark fuscous. Legs in ♂ fuscous, posterior tibiae mixed with whitish-ochreous, somewhat dilated, enclosing a pale brownish-ochreous hair-pencil, in ♀ whitish sprinkled with dark fuscous, posterior tarsi in ♂ ⅚. Forewings rather elongate-triangular, termen in ♂ rather obliquely rounded, slightly waved, in ♀ rather obliquely bowed, hardly sinuate beneath apex, waved; light ochreous-brown in ♂, pale brownish-ochreous to ochreous-brown in ♀, finely strigulated with dark fuscous; first, median, and second lines darker, indistinct (in ♀ sometimes well-marked), first and second more or less distinctly dotted with dark fuscous, first bent near costa, median rather curved, second moderately curved on upper ⅔; a very indistinct darker transverse discal spot, absorbed in median line; in one strongly-marked ♀ a fuscous suffused patch extending from middle of disc to termen, except towards costa and dorsum, and a praesubterminal shade. Hindwings with termen waved; colour and markings as in forewings, but first line obsolete, discal spot imperceptible. (Plate IV. fig. 29.)

13 specimens; 4 Kona, Hawaii, at 4000 feet; 8 Kilauea, Hawaii; 1 Olaa, Hawaii; from June to September, and in December. The females vary much in depth of colouring, one being darker than any male, though most are lighter. Closely allied to *S. isospora*, from which it may be distinguished especially by the waved, not dentate, termen of hindwings; the average size is larger, the general colouring warmer and deeper, and the forewings in the ♂ are without trace of the subapical sinuation, which is faint yet perceptible in *S. isospora*; the posterior tarsi in the ♂ are relatively longer.

(8) *Scotorythra homotrias*, sp. nov.

♀. 42 mm. Head, thorax, and abdomen light brownish-ochreous, abdomen sprinkled with dark fuscous. Antennae whitish-ochreous, ringed with dark fuscous. Forewings triangular, termen hardly waved, slightly bowed, oblique; brownish-ochreous, faintly purplish-tinged, obscurely strigulated with dark fuscous, costa paler and sharply strigulated; first, median, and second lines indistinct, deeper ochreous, slightly curved, nearly parallel and equidistant, first and second marked with series of blackish dots; a hardly darker praesubterminal shade. Hindwings with termen gently waved; colour and lines as in forewings, but colour rather deeper and yellower ochreous, first line obsolete, others faint.

1 specimen, Olaa, Hawaii, in September. Differs from the preceding group by the larger size, less curved termen and lines, and less waved termen of hindwings; the colouring is much as in *S. aruraea*.

(9) *Scotorythra hecataea*, sp. nov.

♀. 39 mm. Head and thorax pale greyish-ochreous. Antennae whitish-ochreous, suffusedly ringed with fuscous. Abdomen pale greyish-ochreous, somewhat sprinkled with dark fuscous. Legs pale greyish-ochreous, mottled with dark fuscous. Forewings elongate-triangular, termen hardly waved, faintly sinuate beneath apex, bowed, oblique; pale greyish-ochreous, irregularly strigulated with dark fuscous; first line ferruginous, strongly curved above middle; a broad cloudy straight median shade of ferruginous and fuscous suffusion, in which is placed a curved-linear transverse whitish discal mark; second line faintly whitish, edged anteriorly by a series of ferruginous dots parallel to termen throughout; a terminal band of ferruginous suffusion, terminated above by an oblique subapical streak, and enclosing a slender pale subterminal line. Hindwings with termen waved; light grey, sprinkled with dark grey; a fine indistinct dark grey postmedian dotted line.

1 specimen, Waimea Mts., Kauai, at 4000 feet, in May. This species seems to stand rather isolated; the form of the second line of the forewings is rather peculiar, and the sinuate termen, curved-linear pale discal mark, broad median shade, and ferruginous colouring are characteristic features.

(10) *Scotorythra trapezias*, sp. nov.

♂♀. 26—35 mm. Head and thorax fuscous, sometimes darker or reddish-tinged, thorax with two small posterior whitish tufts, crown and thorax sometimes spotted with whitish. Antennae whitish, irregularly spotted with dark fuscous, pectinations 6—7, irregularly blotched. Abdomen pale fuscous sprinkled with darker, in ♂ $1\frac{1}{3}$. Legs dark fuscous irregularly spotted with pale whitish-ochreous, posterior tibiae in ♂ rather dilated, enclosing a pale brownish-ochreous hair-pencil, posterior tarsi in ♂ $\frac{4}{5}$. Forewings somewhat elongate-triangular, termen bowed, rather oblique; brownish-ochreous or fuscous, usually somewhat reddish-tinged, with scattered black scales, veins in one specimen pale ochreous-yellow; first line darker, on upper half stronger and blackish, sometimes dilated anteriorly to form a blackish spot above middle, somewhat bent near costa, acutely angulated in middle, sinuate inwards towards dorsum; a trapezoidal lighter or sometimes white blotch occupying cell beyond this, broadest above, upper edge parallel to costa, posterior edge formed by a sinuate inwardly oblique fine blackish line, sometimes followed by a blackish suffusion which in one specimen invades lower portion of the blotch (perhaps representing median line, which is not otherwise indicated); discal spot crescentic, yellow-ochreous or whitish-ochreous or more often quite obsolete, sometimes partially irregularly edged with black; sometimes a whitish suffusion towards costa beyond this; second line fine, pale, sometimes dotted with ochreous-whitish, edged anteriorly with blackish dots and posteriorly with a line of ground-colour, nearly straight, sinuate outwards in middle; beyond this a band of paler suffusion, strigulated with dark grey; subterminal line sometimes indistinctly pale, anteriorly darker-edged; a terminal series of dark fuscous dots. Hindwings with termen somewhat waved; grey; an indistinct darker discal mark and postmedian series of dots. (Plate IV. fig. 30.)

27 specimens; 20 Kaholuamano, Kauai; 7 Waimea Mts., Kauai, at 4000 feet; from April to June. Varies considerably, but easily distinguished from all others by the peculiar form of the strongly marked first line, and the pale blotch following it.

(11) *Scotorythra anagraptis*, sp. nov.

♀. 38 mm. Head, thorax, and abdomen whitish-ochreous, partly brownish-tinged. Antennae whitish-ochreous, scantily irregularly spotted with dark fuscous. Legs dark fuscous, ringed with whitish-ochreous, posterior pair whitish-ochreous, marbled with fuscous. Forewings very elongate-triangular, termen waved, bowed, oblique; whitish-ochreous, with some scattered black scales; a patch of brownish suffusion towards base of dorsum; first line pale, edged anteriorly with brown and posteriorly with black, very strongly curved, slightly angular somewhat below middle; median brown, black-mixed on upper half, twice sharply angulated outwards in disc, nearly followed by a lunate dark grey discal spot lying between the angulations; second pale, edged anteriorly by a black waved line and posteriorly by a brownish shade, nearly parallel to termen, somewhat curved outwards in middle, sinuate inwards above this and towards dorsum; subterminal slender, pale, waved, preceded by an undefined brownish shade marked with several small blackish spots, and followed towards apex by a brownish suffusion, leaving a pale apical patch; a terminal series of large round black dots. Hindwings with termen unevenly waved; pale grey; a darker discal mark and postmedian series of dots.

1 specimen, Kauai, at 4000 feet, without further data. Also a very distinct species, especially through the peculiar form of the first and median lines.

(12) *Scotorythra idolias*, sp. nov.

♂♀. 28—33 mm. Head and thorax light brown. Antennae pale greyish-ochreous, in ♀ obscurely fuscous-ringed, pectinations 7, whitish, laterally blackish-lined. Abdomen light greyish-ochreous, in ♂ 1—1$\frac{1}{6}$. Legs whitish-ochreous mottled with fuscous, posterior tibiae in ♂ hardly dilated, enclosing a whitish hair-pencil, posterior tarsi in ♂

$\frac{3}{4}$—$\frac{4}{5}$. Forewings somewhat elongate-triangular, termen in ♂ strongly rounded, little oblique, in ♀ rather obliquely bowed ; light fuscous, sometimes ochreous-tinged, sprinkled with blackish dots tending to form strigulae ; first and second lines fuscous dotted with blackish, first strongly curved, more or less abruptly bent near costa, second nearly straight, sinuate inwards above middle and more widely towards dorsum ; median line absent ; a large undefined roundish dark fuscous discal spot, sometimes with pale linear central mark ; an indistinct more or less interrupted fuscous praesubterminal shade ; a terminal series of large blackish dots. Hindwings with termen unevenly waved ; whitish-fuscous ; a faint grey discal mark and postmedian series of dots. (Plate IV. fig. 31.)

88 specimens ; 86, all ♂, Kilauea, Hawaii, in July and August ; 2 ♀ Olaa, Hawaii, in September. That the consignment of 86 specimens from Kilauea should not have included a single female is very curious ; generally in this genus more females were sent than males. The species is readily recognised by its small size, uniform light fuscous colouring, strongly dotted lines, large roundish discal spot, and entire absence of median line ; it varies extremely little.

(13) *Scotorythra paludicola* Butl.

Pseudocoremia paludicola Butl. Ent. Mo. Mag. xv. p. 272.

♂ 28—36 mm., ♀ 31—44 mm. Head and thorax fuscous or reddish-ochreous-brown, crown seldom yellowish, thorax sometimes with posterior extremity whitish. Antennae light ochreous, thinly irregularly spotted with fuscous, pectinations 8, whitish, laterally blackish-lined. Abdomen greyish-ochreous, in ♂ 1$\frac{1}{4}$. Legs light brownish-ochreous, spotted and partly suffused with dark fuscous, posterior tibiae in ♂ little dilated, enclosing a whitish hair-pencil, posterior tarsi in ♂ almost 1. Forewings somewhat elongate-triangular, termen slightly waved, in ♂ strongly bowed, little oblique, in ♀ rather obliquely bowed ; varying from light brownish-ochreous to fuscous or ferruginous, more or less sprinkled with dark fuscous or blackish dots tending to form strigulae ; in one rather dark fuscous ♀ there is an ochreous-whitish subcostal streak from base to $\frac{2}{3}$, leaving costal edge ferruginous ; median band sometimes darker, in one ♂ enclosed by broad fasciae of whitish-ochreous suffusion, in ♀ sometimes enclosed by fasciae of light ferruginous-ochreous suffusion ; first and second lines indistinctly darker, conspicuously dotted with blackish or dark fuscous, first rather strongly curved, sometimes obtusely angulated above middle, second tolerably straight, sinuate inwards above middle and more widely towards dorsum ; median line absent ; a moderate lunate dark fuscous discal spot, usually with more or less distinct pale central linear mark ; subterminal line sometimes obscurely pale ; usually a terminal series of large dark fuscous or blackish dots. Hindwings with termen unevenly waved ; light grey ; an indistinct darker discal mark and postmedian series of dots.

28 specimens; 21 Haleakala, Maui, at 5000 feet; 2 Waimea Mts., Kauai, at 4000 feet; 1 Kaholuamano, Kauai, at 4000 feet; 3 Kilauea, Hawaii; 1 Hilo, Hawaii, at 2000 feet; in January, from March to May, and in August. Closely allied to *S. idolias*, but instead of being very constant it is very variable; it differs further in the deeper and brighter colouring, narrower and more lunate discal spot, and frequently larger size, as also in the greater proportionate length of the abdomen and posterior tarsi of the male. The female is best distinguished from the same sex of *S. rara* by the smaller size, and lighter and more ferruginous colouring. The Kauai specimens, being only females, might possibly be found to represent a distinct species.

(14) *Scotorythra demetrias*, sp. nov.

♂ 32 mm., ♀ 43 mm. Head and thorax pale ferruginous-ochreous, darker in ♀. Antennae ochreous-whitish, pectinations 6, blackish-lined. Abdomen whitish-ochreous, in ♂ $1\frac{2}{5}$. Legs pale ochreous, posterior tibiae in ♂ hardly dilated, enclosing an ochreous-whitish hair-pencil, posterior tarsi in ♂ $\frac{3}{4}$. Forewings elongate-triangular, termen bowed, oblique, more so in ♀, not waved; in ♂ yellow-ochreous, with scattered fine dark fuscous strigulae, in ♀ ferruginous-ochreous; first and second lines well-marked, dark fuscous, first almost straight, slightly bent near costa, second slightly bent in middle, faintly sinuate inwards towards dorsum, in ♀ first preceded and second followed by a fuscous-tinged fascia; discal spot narrow, transverse, light fuscous, undefined. Hindwings with termen unevenly rounded; ochreous-whitish, more ochreous-tinged terminally; a fuscous median line, angulated in middle. (Plate IV. fig. 32.)

2 specimens, Kilauea, Hawaii, in August. A very distinct species, well characterised by the ochreous-whitish hindwings, with entire fuscous line.

(15) *Scotorythra goniastis*, sp. nov.

♂ 36 mm., ♀ 48 mm. Head and thorax fuscous. Antennae fuscous-whitish, pectinations in ♂ 6, blackish-lined. Abdomen whitish-fuscous, in ♂ $1\frac{2}{3}$. Legs fuscous-whitish, somewhat fuscous-mixed, posterior tibiae in ♂ dilated, enclosing a light fuscous hair-pencil, posterior tarsi in ♂ $\frac{7}{8}$. Forewings elongate-triangular, apex distinctly prominent, termen somewhat sinuate beneath apex, bowed, rather oblique; light fuscous, in ♂ strigulated with darker, in ♀ deeper and faintly ochreous-tinged; in ♀ costal edge and all veins ochreous-white; first and second lines in ♂ dark fuscous accompanied externally by a second less dark line, in ♀ ochreous-white, first strongly angulated near costa, second rather irregular, hardly prominent in middle, sinuate inwards towards dorsum; discal spot narrow, transverse, somewhat lunate, in ♂ outlined with dark fuscous, in ♀ ochreous-white; a terminal series of dark fuscous dots. Hindwings with termen slightly waved; pale fuscous; a faint postmedian series of darker dots.

2 specimens received by me from Mr Blackburn; locality not indicated, but not improbably Haleakala, Maui. The white veins and markings of the female specimen are very possibly not constant. The species is best recognised (except from *S. ortharcha*) by the prominent apex of the forewings; the proportionately long abdomen of the male, the unspotted shaft of antennae, and the strongly angulated first line are also notable characters.

(16) *Scotorythra ortharcha*, sp. nov.

♂♀. 32—39 mm. Head and thorax dark grey or ashy-fuscous, sometimes irrorated with black. Antennae fuscous spotted with black, pectinations 7, whitish, laterally black-lined. Abdomen pale grey, sometimes sprinkled with black, in ♂ $1\frac{1}{2}$. Legs dark grey, tips of joints whitish, posterior tibiae in ♂ little dilated, enclosing a whitish hair-pencil, posterior tarsi in ♂ $\frac{5}{6}$. Forewings rather elongate-triangular, apex distinctly prominent, termen sinuate beneath apex, bowed, waved, oblique; purple-whitish to light fuscous, sometimes partially bluish-tinged, densely strigulated with dark fuscous or blackish; first line pale, more or less obscure, placed in a dark fuscous fascia of which the anterior edge is quite straight and sharply defined, posterior less sharp; a cloudy rather dark fuscous straight median shade, preceding discal spot, which is curved-linear, pale or white, black-edged; second line slender, whitish, interrupted, sinuate inwards above middle and more widely towards dorsum, suffusedly edged with dark fuscous; subterminal line pale or nearly obsolete, especially towards dorsum, posteriorly edged by a darker shade; a terminal series of blackish dots. Hindwings with termen waved; grey; a fine irregular waved darker postmedian line, followed by a faint less dark shade. (Plate V. fig. 1.)

9 specimens, Olaa, Hawaii, at 2000 feet, from September to November. This and the following species are distinguished from all others by the entire waved line of the grey hindwings, and also by their usually bluish-tinged forewings; they are separated from each other by the difference in the first line, which in *S. ortharcha* is practically straight, in *S. oxyphractis* acutely angulated near costa.

(17) *Scotorythra oxyphractis*, sp. nov.

♂ 35—45 mm., ♀ 37—51 mm. Head and thorax dark brown sprinkled with white. Antennae in ♂ yellow-ochreous, pectinations 8—9, whitish above, elsewhere dark fuscous, in ♀ brownish-ochreous. Abdomen pale grey, in ♂ $1\frac{1}{3}$. Legs pale greyish-ochreous, mixed or suffused with dark grey, posterior tibiae in ♂ hardly dilated, enclosing a whitish hair-pencil, posterior tarsi in ♂ nearly 1. Forewings somewhat elongate-triangular, termen waved, bowed, rather oblique; dark fuscous, sometimes ferruginous-tinged, irrorated with pale shining purple-bluish or blue-whitish, sometimes very sparsely; first line slender, obscure, of pale irroration sometimes marked with yellow-ochreous dots on veins, enclosed in a dark fuscous fascia, acutely angulated above middle, bent or sinuate inwards towards dorsum; discal spot transverse-oval, blackish-fuscous, sometimes enclosing a curved linear pale bluish mark, which in one ♂ is edged with bright ferruginous, or in ♀ sometimes wholly blue-whitish, lunate, without dark edging; seldom a faint dark median shade beyond this; second line fine, pale, very obscure, sharply edged anteriorly with dark fuscous, sometimes marked with yellow-ochreous dots on veins, irregularly waved, sinuate inwards above middle and towards dorsum; subterminal line slender, pale, usually almost obsolete except on costal third, where it is preceded by a dark shade; a terminal series of blackish dots. Hindwings with termen waved; grey; an irregularly waved dark grey postmedian line.

10 specimens; 9 Olaa, Hawaii; 1 Hilo, Hawaii; in January, June, September, and December. Allied to the preceding species, but perhaps not so nearly as the close superficial resemblance leads one to believe, since when carefully considered they differ in many respects; the acutely angulated first line is the obvious distinction.

(18) *Scotorythra triscia*, sp. nov.

♂♀. 36—40 mm. Head and thorax brown, somewhat tinged with reddish. Antennae in ♂ ochreous-whitish, spotted with dark fuscous, pectinations 5—6, irregularly blotched, in ♀ yellow-ochreous, obscurely spotted. Abdomen light ochreous-grey, in ♂ $1\frac{1}{2}$. Legs ochreous-whitish, spotted with dark fuscous, posterior tibiae in ♂ dilated, enclosing a whitish hair-pencil, posterior tarsi in ♂ $\frac{3}{5}$. Forewings elongate-triangular, termen hardly waved, bowed, rather oblique; brownish-ochreous or ochreous-fuscous, tinged with reddish and strigulated with dark fuscous; first, median, and second lines represented by thick undefined darker shades, first bent near costa, median nearly straight, second somewhat bisinuate; subterminal line represented by a narrower dark shade, sometimes obsolete; discal spot merged in median shade, obsolete. Hindwings with termen hardly waved; whitish-grey, obscurely strigulated with darker grey; a small dark grey discal spot, and postmedian series of dots.

12 specimens, Wailuku, Maui, from August to October. Constant; although not conspicuous, it is easily recognised by the uniform light reddish-fuscous colouring and three darker shades; the posterior tarsi of the male are also unusually short, though not so short as in *S. brachytarsa*.

(19) *Scotorythra capnopa*, sp. nov.

♂♀. 36—39 mm. Head and thorax dark fuscous. Antennae whitish, blotched or in ♀ almost wholly suffused with dark fuscous, pectinations 6, irregularly blotched. Abdomen grey, in ♂ $1\frac{1}{3}$. Legs dark fuscous, spotted with ochreous-whitish, posterior tibiae in ♂ dilated, enclosing an ochreous-whitish hair-pencil, posterior tarsi in ♂ $\frac{4}{5}$. Forewings elongate-triangular, termen waved, bowed, rather oblique; fuscous, strigulated or almost wholly suffused with dark fuscous, veins partly ochreous-tinged; first and second lines blackish-fuscous, edged externally with dark fuscous shades, irregular, first gently curved, second sinuate inwards above middle and more widely towards dorsum; discal spot large, transverse-oval, usually only obscurely darker-outlined, in one ♀ mixed with ochreous; between second and subterminal lines a somewhat lighter fascia, in one ♂ brownish-ochreous; subterminal line only indicated by an undefined dark brown shade; sometimes a terminal series of pale ochreous dots. Hindwings with termen waved; grey, darker posteriorly, indistinctly darker-strigulated; a faint darker discal spot.

9 specimens, Olaa, Hawaii, in June and September. Characterised by the rather small size and dark colouring, with darker shades attached to first and second lines.

(20) *Scotorythra platycapna*, sp. nov.

♀. 47 mm. Head, thorax, and abdomen rather dark fuscous, pale-sprinkled. Antennae light greyish-ochreous, fuscous-sprinkled. Legs pale greyish-ochreous spotted with dark fuscous. Forewings triangular, termen waved, rather strongly bowed, oblique; rather dark fuscous, darker-irrorated; veins posteriorly and costal edge obscurely ochreous; a curved band of obscure ochreous suffusion towards base, and a nearly straight one at about $\frac{4}{5}$, enclosing unusually broad median band; lines obsolete; a linear curved transverse grey discal spot, edged anteriorly with dark fuscous suffusion, and posteriorly with two small dark fuscous spots. Hindwings with termen unevenly waved; fuscous, obscurely darker-strigulated.

1 specimen, Waimea Mts., Kauai, at 4000 feet, in May. A peculiar form of dubious specific relationship; the unusually broad forewings (especially for a female), the obsolescence of all lines, and character of the discal spot are the most noticeable points, but the male may differ considerably in appearance.

(21) *Scotorythra nephelosticta*, sp. nov.

♂ 34—42 mm., ♀ 42—49 mm. Head and thorax dark brown or dark fuscous. Antennae ochreous-whitish, irregularly spotted and in ♀ mostly suffused with dark fuscous, pectinations 7—8, irregularly blotched. Abdomen pale fuscous, in ♂ $1\frac{1}{2}$.

Legs dark fuscous ringed with whitish-ochreous, posterior pair whitish-ochreous marbled with dark fuscous, posterior tibiae in ♂ dilated, enclosing an ochreous-whitish hair-pencil, posterior tarsi in ♂ $\frac{5}{6}$. Forewings elongate-triangular, termen bowed, waved, rather oblique; dark brown or dark fuscous, strigulated with blackish, median band in ♂ broader than usual and generally enclosed by fasciae of lighter brown or sometimes pale brownish-ochreous; first and second lines formed of rather large blackish dots on veins, in ♀ sometimes waved, entire, first curved, bent near costa, second sometimes accompanied by fine whitish dots, sinuate inwards above middle and towards dorsum; discal spot in ♂ undefined, suboval, transverse, white or ochreous-whitish, sometimes seeming a group of dots, in ♀ lunate, hardly paler, dark-edged; subterminal line sometimes obscurely indicated with pale brownish-ochreous or whitish scales; sometimes a terminal series of fine pale brownish-ochreous dots. Hindwings with termen slightly waved, in ♀ more strongly; grey, lighter towards base, faintly darker-strigulated; a small discal mark in ♂ obscurely darker-outlined, in ♀ usually wholly dark; a postmedian series of darker dots.

25 specimens; 17 Kaholuamano, Kauai, at 4000 feet; 7 Waimea Mts., Kauai, at 4000 feet; 1 Makaweli, Kauai; from April to June. The ♂ is readily recognised amongst its near allies by the peculiar undefined whitish discal spot; the ♀ sometimes very closely resembles small dark examples of *S. rara*, but may be distinguished by the more waved termen of forewings.

(22) *Scotorythra trachyopis*, sp. nov.

♂♀. 44—50 mm. Head and thorax brown, ferruginous-tinged. Antennae whitish-ochreous, irregularly spotted with fuscous or dark fuscous, pectinations 7—8, partially dark-speckled, base black. Abdomen pale brownish-ochreous, in ♂ $1\frac{1}{3}$. Legs pale brownish-ochreous, spotted with fuscous or dark fuscous, posterior tibiae in ♂ considerably dilated, enclosing a pale whitish-ochreous hair-pencil. Forewings elongate-triangular, more elongate in ♀, termen bowed, oblique, in ♂ waved-dentate, in ♀ more oblique, waved; in ♂ beneath with elongate-oval glandular patch of modified whitish-ochreous scales in cell; ferruginous-brown, irregularly mixed with pale ochreous and blackish; first and second lines darker, waved-dentate, marked with large blackish dots, first angulated above middle, second sinuate inwards above middle and towards dorsum, median band narrower than usual; discal spot large, broad-reniform, dark, blackish-edged; subterminal line obscurely indicated, pale, edged anteriorly with darker suffusion; a terminal series of large blackish dots. Hindwings with termen somewhat waved; whitish-brownish, somewhat ochreous-tinged, indistinctly sprinkled with grey; discal mark and postmedian series of grey dots indistinct or sometimes hardly traceable; in ♂ beneath with scales somewhat modified towards upper posterior angle of cell.

4 specimens; 2 Waimea Mts., Kauai, at 4000 feet; 2 Kaholuamano, Kauai, at 4000 feet; from April to June. A peculiar species, distinguishable by the waved-dentate lines and unusually elongate forewings, with other characteristics; the ♂ differs from all by the glandular discal patch of scales beneath, which would admit of generic separation but does not seem to require it.

(23) *Scotorythra macrosoma*, sp. nov.

♂♀. 36—55 mm. (larger specimens usually ♀). Head and thorax brown or fuscous, sometimes mixed with whitish or dark fuscous, sometimes mostly suffused with whitish and then showing dark fuscous anterior band and two posterior transverse lines on thorax. Antennae whitish, irregularly spotted or blotched with dark fuscous, pectinations 6, irregularly blotched. Abdomen pale fuscous, somewhat darker-mixed, in ♂ almost 2. Legs whitish or ochreous-whitish, spotted and blotched with dark fuscous, posterior tibiae in ♂ dilated, enclosing a whitish-ochreous hair-pencil, posterior tarsi in ♂ $\frac{5}{6}$. Forewings elongate-triangular, termen waved, bowed, oblique; varying from fuscous to light ochreous-brown or fuscous-whitish, rather thinly strewn with dark fuscous strigulae or dots; first and second lines darker, conspicuously dotted with dark fuscous on veins, first strongly curved, bent above middle and somewhat sinuate near dorsum, nearly preceded by a parallel dark shade which in pale specimens is very conspicuous, second waved, sinuate inwards above middle and towards dorsum, sometimes followed by an indistinct pale line and then by a dark shade; discal spot large, broadly dilated on lower half, wholly suffused with dark fuscous, sometimes preceded and followed by patches of white suffusion extending to first and second lines; subterminal line obscurely pale or seldom whitish, sometimes edged anteriorly with darker suffusion; sometimes an apical spot of pale suffusion, edged beneath with darker; a terminal series of dark fuscous dots. Hindwings with termen waved; fuscous or grey, lighter towards base, obscurely darker-strigulated; a dark grey transverse discal spot, and bisinuate postmedian series of dots. (Plate V. fig. 2.)

78 specimens; 63 Olaa, Hawaii; 3 Hilo, Hawaii; 2 Molokai; 6 Kaholuamano, Kauai, at 4000 feet; 4 Waimea Mts., Kauai, at 4000 feet; in January, April to June, September, November, and December. The ♂ differs from all by the peculiarly long abdomen; the species varies considerably in colour, but the characteristic large dark discal spot, dilated beneath, is always prominent, and renders it easy of recognition.

(24) *Scotorythra pachyspila*, sp. nov.

♂♀. 36—45 mm. Head and thorax fuscous, mixed with whitish and dark fuscous and sometimes with red-brown, crown and thorax sometimes wholly dark fuscous.

Antennae whitish-ochreous or pale brownish-ochreous, irregularly spotted and blotched or in one ♀ much suffused with dark fuscous, pectinations 6—7, lined with dark fuscous. Abdomen pale fuscous, somewhat darker-sprinkled, in ♂ $1\frac{1}{2}$. Legs pale greyish-ochreous irregularly spotted with dark fuscous, posterior tibiae in ♂ dilated, enclosing a whitish hair-pencil, posterior tarsi in ♂ $\frac{5}{6}$. Forewings elongate-triangular, termen bowed, oblique; ochreous-brown, fuscous, or bronzy-fuscous, mixed or strigulated with dark fuscous, sometimes partly suffused with ferruginous, sometimes mixed with greyish-yellowish; veins sometimes more or less clear ochreous-yellow; first and second lines usually whitish or pale yellowish, internally dark-edged, sometimes black-dotted, first strongly curved, somewhat bent near costa, second slightly waved, sinuate inwards above middle and more widely towards dorsum, somewhat projecting in middle; in ♀ median band sometimes enclosed by broad externally suffused light ochreous-yellow bands; a usually rather undefined dark fuscous discal blotch, dilated beneath, often enclosing a curved-linear ochreous-yellow transverse mark, sometimes preceded and followed by patches of ochreous-whitish suffusion; sometimes a faint dark median shade traversing this; subterminal line whitish, waved, terminating in a pale triangular apical patch; a terminal series of large dark fuscous dots. Hindwings with termen waved; pale grey; an indistinct dark grey discal mark and postmedian bisinuate series of dots. (Plate III. figs. 4, 4 *a*—4 *d*.)

16 specimens; 11 Olaa, Hawaii; 1 Kona, Hawaii, at 4000 feet; 1 Kilauea, Hawaii; 2 Lanai, at 3000 feet; 1 Haleakala, Maui, at 5000 feet; in July, and from September to December. Very variable; it cannot however well be confused with any other.

(25) *Scotorythra artemidora*, sp. nov.

♂♀. 35—37 mm. Head and thorax light brownish mixed with dark fuscous. Antennae pale brownish-ochreous, irregularly spotted with dark fuscous, pectinations 6—7, obscurely dark-lined. Abdomen pale fuscous, somewhat darker-sprinkled, in ♂ $1\frac{1}{2}$. Legs pale greyish-ochreous, irregularly blotched with dark fuscous, posterior tibiae in ♂ dilated, enclosing a whitish hair-pencil, posterior tarsi in ♂ $\frac{5}{6}$. Forewings elongate-triangular, termen bowed, oblique; brown, mixed with dark fuscous; first and second lines hardly paler fuscous, internally dark-edged, first strongly curved, somewhat bent near costa, second somewhat waved, rather sinuate inwards above middle and towards dorsum, somewhat projecting in middle; a curved narrow ochreous-yellow discal mark; subterminal line faint, obscurely grey-whitish; a small irregular blotch of pale suffusion before apex; a terminal series of dark fuscous dots; dorsal edge and terminal cilia clear whitish-ochreous or light yellowish. Hindwings with termen unevenly waved; pale grey, posteriorly darker-strigulated; a pale dark-edged crescentic discal mark; a bisinuate postmedian series of dark grey dots.

2 specimens, Olaa, Hawaii, in September. Nearly allied to *S. pachyspila*, but distinguished from it and all other species by the clear whitish-ochreous dorsal edge and terminal cilia of the forewings.

(26) *Scotorythra brachytarsa*, sp. nov.

♂ 42—45 mm., ♀ 46—52 mm. Head fuscous to ochreous-brownish, seldom ferruginous or whitish. Antennae ochreous-whitish or (in ♀) pale ochreous, spotted with dark fuscous, pectinations 8, blackish-lined. Thorax fuscous or ochreous-brown, often with a more or less developed white or ochreous-yellowish posterior dot or spot. Abdomen pale fuscous, in ♂ 1½. Anterior and middle legs dark fuscous, femora paler, dark-spotted; posterior legs ochreous-white marbled with fuscous, tibiae in ♂ considerably dilated, enclosing an ochreous-whitish hair-pencil, tarsi in ♂ ½. Forewings rather elongate-triangular, termen moderately waved, bowed, rather oblique; rather dark fuscous, in ♀ sometimes suffused with ferruginous or ochreous-brown, median band sometimes enclosed (mostly in ♀) by broad lighter ochreous-brown fasciae; first and second lines formed of indistinct dark fuscous dots, often accompanied by whitish dots, in ♀ sometimes connected by waved dark lines, first curved, second sinuate inwards above middle and towards dorsum; discal spot narrow, crescentic, often pale or white or ochreous-yellow, sometimes only obscurely dark-outlined, followed by a faint darker median shade; subterminal line in ♀ often obscurely pale, waved, in ♂ only indicated by traces of a dark preceding shade; a terminal series of dark fuscous dots. Hindwings with termen gently waved; whitish-fuscous, becoming fuscous posteriorly; a series of dark fuscous dots at ⅔; in ♀ a dark grey discal dot. (Plate V. fig. 3.)

89 specimens; 88 Olaa, Hawaii, in June, September, November, and December; 1 Hilo, Hawaii, at 2000 feet, in January. A variable species; the ♂ is distinguished from all others by the unusually short posterior tarsi; the ♀ is sometimes only separable from *S. rara* by the more waved termen of the forewings, but is not by any means so variable as that species, and is not found in the same localities.

(27) *Scotorythra rara* Butl.

Scotosia rara Butl. Ent. Mo. Mag. XV. p. 273; ib. XVII. p. 8.

♂ 39—46 mm., ♀ 45—55 mm. Head and thorax brown to dark fuscous, often ferruginous-tinged, crown of head seldom whitish, thorax seldom with whitish posterior spot. Antennae in ♂ ochreous-whitish, spotted with dark fuscous, pectinations 8, blackish-lined, in ♀ ochreous spotted or suffusedly blotched with dark fuscous. Abdomen pale greyish-ochreous to fuscous, in ♂ $1\frac{1}{2}$. Anterior and middle legs dark fuscous, femora whitish-ochreous, dark-spotted; posterior legs ochreous-whitish marbled with fuscous, tibiae in ♂ rather dilated, enclosing an ochreous-whitish hair-pencil, tarsi in ♂ $\frac{3}{4}$—$\frac{4}{5}$. Forewings elongate-triangular, termen gently waved, bowed, oblique; fuscous or ochreous-brown, sometimes ferruginous-tinged, in ♀ varying also to whitish-brown or dark fuscous, strigulated with dark fuscous or blackish; in ♀ sometimes a sharply defined whitish-ochreous, pale reddish-ochreous, or bright ferruginous costal streak from base to second line, broader anteriorly; median band in ♀ sometimes conspicuously darker fuscous, enclosed by broad fasciae of ochreous or brownish suffusion; first and second lines formed of dark fuscous or blackish dots, often accompanied by whitish dots, in ♀ sometimes connected by slightly waved dark lines, first unevenly curved, sometimes bent above middle, second sinuate inwards above middle and more widely towards dorsum; discal spot lunate, edged with dark fuscous suffusion, in ♂ seldom whitish or pale ochreous; median shade very faint or obsolete, only in one pale ♀ dark brown, conspicuous; subterminal line obscurely pale or obsolete, or indicated by faint darker preceding shade; rarely a terminal series of ochreous-whitish or dark fuscous dots. Hindwings with termen waved; a dark grey small discal spot and postmedian series of dots, only in one pale ♀ connected by a waved line. (Plate III. figs. 5, 5*a*—5*d*.)

77 specimens; 35 Waimea Mts., Kauai, at 4000 feet; 22 Kaholuamano, Kauai, at 4000 feet; 1 Honolulu Mts., Oahu; 3 Haleakala, Maui, at 5000 feet; 15 Kona, Hawaii, at 4000 feet; 1 Kawailoa, Hawaii; from April to June, in August, September, and November. I have also three of Mr Blackburn's specimens from the original locality, Haleakala, whence comes the British Museum type (a very dark ♀). The male is not very variable, but the female is exceedingly so. The size, dark colouring, and only gently waved termen of the forewings will generally serve to distinguish it.

(28) *Scotorythra euryphaea*, sp. nov.

♂ 46—59 mm., ♀ 60—71 mm. Head and thorax varying from brown to bright ferruginous, seldom dark fuscous or ochreous-yellowish mixed with fuscous. Antennae in ♂ pale fuscous or fuscous-whitish, unspotted, pectinations 10, laterally black-lined; in ♀ yellow-ochreous, thinly spotted with dark fuscous. Abdomen light greyish-ochreous, in ♂ $1\frac{1}{3}$. Legs in ♂ fuscous, in ♀ orange-ochreous marbled with dark fuscous; posterior tibiae pale, in ♂ somewhat dilated, enclosing an ochreous-whitish hair-pencil, posterior tarsi in ♂ almost 1. Forewings elongate-triangular, broader in ♂, termen slightly waved, bowed, oblique; in ♂ dark ferruginous-brown, strigulated with dark fuscous, sometimes partially mixed with ferruginous suffusion, in ♀ varying from orange-ochreous to ferruginous-brown, strigulated with dark fuscous; median band in ♂ sometimes enclosed by fasciae of partially confluent yellow spots; first and second lines dark fuscous, often very indistinct, seldom forming series of dots, sometimes accompanied by series of whitish dots, first unevenly curved, second slightly sinuate inwards towards dorsum; median shade darker, usually very faint, seldom distinct, somewhat angulated above middle; discal spot very obscurely darker, hardly defined, placed on median shade, in ♀ sometimes distinct, oval or lunate; subterminal line obscurely pale, waved, very faint or obsolete. Hindwings with termen in ♂ hardly, in ♀ gently waved; in ♂ light fuscous, darker terminally, in ♀ ochreous-yellowish irrorated with fuscous or seldom wholly fuscous; usually a faint postmedian series of darker dots. (Plate V. fig. 4.)

43 specimens; 19 Waimea Mts., Kauai, at 4000 feet; 21 Kaholuamano, Kauai, at 4000 feet; 2 Haleakala, Maui, at 5000 feet; 1 Molokai; from April to July, and in October. Differs from all the preceding by its large size, long antennal pectinations, and peculiar form of the second line of forewings, which is not sinuate above middle.

(29) *Scotorythra hyparcha*, sp. nov.

♂ 53—61 mm., ♀ 65—75 mm. Head and thorax in ♂ dark fuscous, in ♀ varying from ferruginous-ochreous to dark brown. Antennae in ♂ grey, pectinations 10, pale, laterally blackish-lined, in ♀ ochreous, spotted or almost wholly suffused with dark fuscous. Abdomen in ♂ 1⅓, pale grey, darker-mixed, in ♀ pale ochreous, fuscous-sprinkled. Legs in ♂ rather dark fuscous, posterior tibiae pale ochreous marbled with fuscous, somewhat dilated, enclosing an ochreous-whitish hair-pencil, posterior tarsi 1, in ♀ light ochreous-yellowish marbled with dark fuscous. Forewings elongate-triangular, broader in ♂, termen in ♂ waved, in ♀ dentate, bowed, oblique; in ♂ dark fuscous, darker-strigulated, in ♀ varying from ferruginous-ochreous or brownish-ochreous to dark brown, strigulated with dark fuscous; first and second lines faintly paler, waved, obscurely dark-edged, often accompanied with series of small dark fuscous spots, in one ♂ by ochreous spots, first bent above middle, second hardly curved; discal spot large, oval or narrow-transverse, dark fuscous, more often obsolete; median line faintly darker, beyond discal spot, bent above middle; subterminal obscurely pale, edged with obscure darker shades. Hindwings with termen unevenly waved; in ♂ light fuscous, darker terminally, in ♀ pale fuscous, sometimes ochreous-tinged, darker-strigulated; sometimes a faint darker discal spot.

7 specimens; 5 Olaa, Hawaii, in September; 1 Hilo, Hawaii, at 2000 feet, in December; 1 Kilauea, Hawaii, in August. Closely allied to *S. euryphaea*, but easily distinguished by the more strongly waved or in ♀ dentate termen of forewings.

(30) *Scotorythra megalophylla*, sp. nov.

♀. 81—87 mm. Head and thorax yellow-ochreous, sometimes suffused with orange or ferruginous. Antennae ochreous, spotted with dark fuscous. Abdomen light ochreous-yellowish, sometimes sprinkled with fuscous. Legs orange, spotted with fuscous. Forewings rather elongate-triangular, costa slightly sinuate posteriorly, apex prominent, subfalcate, termen concave below apex, then waved, bowed, oblique; ochreous-yellow, thinly sprinkled with fuscous, or more or less densely suffusedly strigulated with ferruginous-brown; costa sometimes suffused with fiery orange on anterior half; first and second lines ferruginous, sometimes very obscure, more or less marked with blackish dots on veins, first gently and evenly curved, second rather sinuate inwards on lower half, sometimes followed by a deeper suffusion; no discal spot; cilia dark fuscous, base ferruginous, tips whitish. Hindwings with termen unevenly waved; light ochreous-yellowish, sometimes tinged with orange or fuscous, more or less sprinkled with dark fuscous; an indistinct darker discal spot, and sometimes a postmedian series of dark dots. (Plate V. fig. 5.)

3 specimens; 2 Olaa, Hawaii; 1 Kona, Hawaii, at 3000 feet; in September. It is a pity the male of this fine insect was not discovered, but it may be expected to present differences analogous to those of the same sex in *S. euryphaea*. The female is apparently variable, but immediately recognisable by its large size and subfalcate forewings; the dark cilia are also a characteristic feature.

TRITOCLEIS, gen. nov.

Face with projecting scales. Tongue developed. Antennae in ♂ bipectinated, simple on apical third and on one joint above basal. Palpi rough-scaled. Thorax thinly hairy beneath. Femora glabrous, posterior tibiae in ♂ not dilated, without hair-pencil. Forewings in ♂ without fovea; 10 out of 11, connected with 9 to form well-defined areole. Hindwings normal.

The connection of vein 10 with 9 is not here (as in the preceding genus and many others of the family) the casual and unimportant conjunction at a point of two almost parallel and closely approximated veins, but 10 is in its lower portion parallel to the upper wall of cell, and only takes an upward direction after its connection with 9.

(31) *Tritocleis microphylla*, sp. nov.

♂. 20 mm. Head and thorax whitish-ochreous, sprinkled with black. Antennae ochreous-whitish, pectinations 12, finely black-lined. Abdomen whitish-ochreous, with double dorsal series of blackish dots, two on basal segment much larger. Forewings triangular, termen bowed, oblique; whitish-ochreous, finely and thinly sprinkled with black; first line indicated only by a blackish dot near dorsum; a cloudy dark grey discal dot; second line unusually near termen, formed by a series of black dots, running from $\frac{5}{6}$ of costa to $\frac{3}{4}$ of dorsum, unevenly curved outwards, beneath costa indented inwards; cilia ochreous-whitish, with a basal series of small black spots. Hindwings with termen slightly waved; pale whitish-ochreous, sprinkled with black; a small narrow-oval discal spot outlined with blackish; second line faint, ochreous, marked with black dots, curved; subterminal indicated by a series of blackish dots; cilia as in forewings. (Plate V. fig. 6.)

1 specimen, Olaa, Hawaii, in November.

SPHINGIDAE.

Deilephila *Ochs.*

(1) *Deilephila* (?) *smaragditis*, sp. nov.

♂. 94 mm. Head yellowish-green, face and palpi dark purplish-fuscous. Thorax green, collar and posterior hairs dark purplish-fuscous. Abdomen long, tolerably cylindrical, green (partly discoloured), on sides and beneath purplish-ochreous. Forewings rather deep glossy bluish-green; lines forming very indistinct cloudy darker yellower-green shades, first absent, median straight, second slightly curved, followed below middle by a small spot of black irroration, subterminal near and parallel to second; a terminal streak of dark purplish-fuscous irroration dilated towards apex (damaged). Hindwings rather dark purplish-fuscous; a faintly indicated darker post-median shade; cilia yellow-whitish, base dark fuscous. Wings beneath purplish-ochreous. (Plate V. fig. 7.)

1 specimen, Makaweli, Kauai, at 2000 feet, "taken some years ago by ladies of the Gay family." This example has lost one antenna and the apical half of the other, and also both posterior legs; it is therefore impossible to determine properly its generic position, and it is only provisionally included in *Deilephila*; it is superficially very distinct from anything known to me. It is a remarkable and beautiful species; and its fair captors might earn additional praise by discovering further specimens, and enabling its affinities to be accurately ascertained.

(2) *Deilephila pyrias*, sp. nov.

♂ ♀. 67—74 mm. Head and thorax very dark brown, a lateral stripe on head, and margins of patagia whitish or yellowish. Antennae dark fuscous, apex whitish. Abdomen orange, on sides and beneath suffused with crimson, with a broad dark brown dorsal stripe, and broad dark fuscous or black bands on margin of segments above. Forewings dark brown, often more or less partially mixed with whitish scales and hairs; lines cloudy, dark fuscous, first curved, indistinct, preceded by triangular dark fuscous or black dorsal blotch, median curved towards costa, often indistinct, second waved, distinct, followed by trapezoidal dark fuscous or black dorsal blotch; a suffused dark fuscous discal spot; a suffused dark oblique apical streak. Hindwings deep orange; a suffused irregular-edged dark fuscous basal patch, extending on costa to $\frac{3}{4}$; a straight-edged dark fuscous or black terminal fascia, attenuated beneath, hardly reaching tornus; cilia pale yellowish, base dark fuscous or black. Wings beneath more or less crimson-suffused. (Plate V. fig. 8.)

11 specimens; 9 Olaa, Hawaii, at 2000 feet; 2 Hilo, Hawaii, at 2000 feet; in January, June, September, November, and December. This and the following species belong to the section often separated as a distinct genus under the name *Choerocampa*; they are apparently best distinguished from each other by the abdominal colouring.

(3) *Deilephila calida* Butl.

Deilephila calida Butl. Ann. Mag. N. H. (5) VII., 1881, p. 317.

Head brown, with pale yellowish line above eyes. Thorax brown, margins of patagia pale yellowish. Antennae dark fuscous, tips white. Abdomen dark brown, beneath pale reddish, three basal segments black on sides except at base which is white, three apical segments with yellow-whitish basal spot on sides. Forewings fuscous; basal area suffused with dark brown, more blackish dorsally, outer edge curved, dorsal cilia on this area white; indistinct darker transverse shades towards costa at $\frac{1}{3}$ and $\frac{2}{3}$, and a roundish dark brown discal spot between these; second line pale yellowish-ochreous except towards costa, nearly parallel to termen but sinuate inwards towards dorsum, followed by a dark brown posteriorly suffused and irregular band, enclosing a blotch of ground-colour on costa. Hindwings blackish-fuscous; a rather irregular vermilion-red postmedian band.

No examples obtained by Mr Perkins; I have described the type in the British Museum, from Oahu.

(4) *Deilephila wilsoni* Roths.

Deilephila wilsoni Roths. Nov. Zool. I. p. 83.

I have not seen this species, but according to the description it should be distinct from either of the two preceding, though allied to them. The body (abdomen) is said to be deep brown with a white border on each side. Locality Hawaii.

(5) *Deilephila lineata* Fab. (*livornica* Esp.).

5 specimens; 3 Olaa, Hawaii; 1 Kilauea, Hawaii; 1 Molokai, at 3000 feet; in June, September and November. Also recorded by Mr Blackburn from Oahu, and apparently rather common. This species is cosmopolitan in warm countries.

SPHINX *Linn.*

Abdomen yellow-spotted ....(*2*) *celeus*.
,, rosy-spotted ....(*1*) *convolvuli*.

(1) *Sphinx convolvuli* Linn. (*cingulata* Fab.).

19 specimens; 17 Kona, Hawaii, at 1500 feet; 1 Olaa, Hawaii; 1 Wailuku, Maui; from September to December. These examples all belong to the American and Pacific form, often separated as a species under the name *cingulata*; it is however incapable of strict definition, and I regard it as a slight geographical form only. The species is practically cosmopolitan.

(2) *Sphinx celeus* Hüb.

Protoparce blackburni Butl. Ent. Mo. Mag. XVII. p. 6.

1 specimen, without locality label. Recorded by Mr Blackburn as occurring rarely near Honolulu, Oahu. The larva is described by Mr Blackburn, Ann. Mag. N. H. 1881, p. 319. Widely distributed in America.

PAPILIONINA.

NYMPHALIDAE.

ANOSIA *Hüb.*

(1) *Anosia erippus* Cram.

6 specimens; 5 Makaweli, Kauai; 1 Kaholuamano, Kauai, at 4000 feet; from February to April. Indigenous to America, but has spread within the last 30 years over the Pacific as far as Celebes, Australia, and New Zealand.

VANESSA *Fab.*

(1) *Vanessa atalanta* Linn.

8 specimens; 6 Olaa, Hawaii; 2 Kona, Hawaii, at 4000 feet; in June, August, September, and December. Occurs in Europe and North America.

(2) *Vanessa tammeamea* Esch.

Vanessa tammeamea Esch. Kotzeb. Reis. III. p. 207, pl. V. 8.

Pyrameis cordelia Doubl. Hew. Gen. pl. XXV. 3.

(Plate V. fig. 9.)

65 specimens; 40 Kilauea, Hawaii; 4 Kona, Hawaii, at 3000 feet; 2 Hilo, Hawaii; 1 Olaa, Hawaii; 1 Panoa, Oahu; 1 Honolulu Mts., Oahu; 1 Kaala Mts.,

Oahu, at 2000 feet; 5 Molokai, at 2500 feet; 1 Lanai; 1 Haleakala, Maui, at 8000 feet; 2 Waimea Mts., Kauai, at 3000—4000 feet; 2 Halemanu, Kauai, at 4000 feet; 1 Kaholuamano, Kauai, at 4000 feet; 3 Makaweli, Kauai, at 2000 feet; from January to October. The anterior spot in the black apical area of forewings is rosy in the male, white in the female. The colouring of the undersurface of hindwings varies much; in the male it is browner, sometimes much ferruginous-suffused, without white suffusion, but often with sharply defined white discal and costal spots, in the female it is often much whitish-suffused and with irregular whitish median fascia, but sometimes very uniform yellow-brownish throughout. The larva is described by Mr Blackburn, Ent. Mo. Mag. XIX. p. 55.

(3) *Vanessa cardui* Linn.

12 specimens; 6 Halemanu, Kauai, bred; 5 Lanai, at sea level; 1 Kona, Hawaii, at 4000 feet; in February, May, and August. Mr Blackburn records it as occurring in various places in plenty, but apparently irregularly, between February and July (Ent. Mo. Mag. XVI. p. 161). Some Lanai specimens are very small, one having an expanse of only 48 mm. A cosmopolitan species.

(4) *Vanessa huntera* Fab.

10 specimens; 8 Kona, Hawaii, at 4000 feet; 1 Koele Mts., Lanai, at 2000 feet; 1 Haleakala, Maui, at 8000 feet; in April, July, and August. Noted also by Mr Blackburn as a regular resident. Occurs in North America.

LYCAENIDAE.

LYCAENA *Fab.*

(1) *Lycaena baetica* Linn.

9 specimens; 7 Mauna Loa, Hawaii, at 1500 feet; 1 Waianae Mts., Oahu; 1 Molokai; in April. Also taken by Mr Blackburn, who has described the larva, Trans. Ent. Soc. Lond. 1882, p. 31. Occurs in Europe, Asia, Africa, Australia, and many Pacific islands.

(2) *Lycaena blackburni* Tuely.

Holochila blackburni Tuely Ent. Mo. Mag. XV. p. 9.

(Plate V. fig. 10.)

70 specimens; 7 Kona, Hawaii, at 3000—4000 feet; 5 Kilauea, Hawaii; 1 Panoa Valley, Oahu, at 1500 feet; 3 Waianae Mts., Oahu, at 2000 feet; 1 Lanai, at 3000

feet; 16 Kaholuamano, Kauai, at 4000 feet; 36 Halemanu, Kauai, at 4000 feet; 1 Makaweli, Kauai, at 2000 feet; from February to May, and in August and September. The larva is described by Mr Blackburn, Ent. Mo. Mag. XIX. 56. Although differing from all other species of the genus in its light bluish-green unspotted undersurface, this insect is structurally a true *Lycaena*, belonging to the group of *argiolus*.

PYRALIDINA.

PHYCITIDAE.

GENOPHANTIS *Meyr.*

Antennae in ♂ rather stout, flatly subdentate, shortly ciliated, above base with a very slight sinuation roughened with scales on inner side; remaining characters as in ♀.

Described originally from the female, and amongst the 24 specimens now sent there were only two males; the characters of this sex, as anticipated, confirm the relationship with *Crocydopora*.

(1) *Genophantis iodora* Meyr.

Genophantis iodora Meyr. Trans. Ent. Soc. Lond. 1888, p. 246.

♂♀. 17—27 mm. Forewings pale ochreous or greyish-ochreous, variably more or less mixed with ferruginous or reddish-fuscous, sometimes much mixed with blackish; in dark-suffused specimens often a pale costal streak, and sometimes an interrupted broader light dorsal streak, often reduced to a pale dorsal blotch beyond first line; first line pale, dark-edged, angulated in middle, on dorsum usually preceded by a small triangular dark spot; discal spot usually forming two transversely placed dark fuscous dots, sometimes obsolete; second line pale, suffusedly dark-edged, nearly straight, parallel to termen, slightly indented above middle. Hindwings pale grey; a suffused darker terminal line. (Plate V. fig. 11.)

24 specimens; 17 Waimea Mts., Kauai, at 4000 feet; 2 Kaholuamano, Kauai, at 4000 feet; 2 Molokai, at 4000 feet; 1 Olaa, Hawaii; 1 Waianae Mts., Oahu, at 2000 feet; 1 Honolulu Mts., Oahu; from April to June, and in September and October. I have redescribed the species, as it varies very considerably in colouring, and was originally described from a single specimen.

PLODIA *Guen.*

(1) *Plodia interpunctella* Hüb.

Recorded by Mr Blackburn; as mentioned under *Ephestia ficulella*.

EPHESTIA *Guen.*

(1) *Ephestia elutella* Hüb.

(2) *Ephestia ficulella* Barr. (? *desuetella* Walk.).

Of these three species no specimens were included; their previous occurrence is recorded in Trans. Ent. Soc. Lond. 1888, p. 244; they are of course domestic and artificially introduced, being now probably cosmopolitan.

EPHESTIODES *Rag.*

The separation of this genus from *Ephestia* is perhaps unnecessary, but may pass for the present.

(1) *Ephestiodes gilvescentella* Rag.

Ephestiodes gilvescentella Rag. Diagn. N. Amer. Phyc. p. 16. *E. infimella* ib. p. 16. *E. erythrella* ib. p. 16.

♂♀. 11—14 mm. Head and thorax grey. Palpi dark grey, sometimes whitish-sprinkled, terminal joint very obtuse. Abdomen grey, apex whitish-ochreous. Forewings elongate, narrow, somewhat dilated posteriorly, termen very obliquely rounded; grey, irrorated with whitish and irregularly sprinkled with black, more or less suffused with a pale reddish tinge; lines cloudy, whitish, darker-edged internally, first slightly curved, oblique, second almost straight; two transversely placed dark fuscous discal dots, sometimes nearly obsolete; cilia grey, irrorated with whitish. Hindwings pale grey, semitransparent; veins and a suffused terminal line dark grey; in ♂ two very small pale ochreous-yellowish subbasal tufts, upper appressed, lower erect.

4 specimens, Molokai, in May. Occurs in North America. I have seen Ragonot's types, which seem to me all to belong to the same species.

HOMOEOSOMA *Curt.*

Forewings with veins 4 and 5 stalked ....(*2*) *amphibola.*
„ „ coincident ....(*1*) *humeralis.*

(1) *Homoeosoma humeralis* Butl.

Ephestia humeralis Butl. Ann. Mag. Nat. Hist. (5) VII. 1881, p. 332. *E. albosparsa* ib. p. 333.

Homoeosoma humeralis Meyr. Trans. Ent. Soc. Lond. 1888, p. 244.

♂♀. 12—19 mm. Forewings very narrow, posteriorly somewhat dilated; vein 5 absent; fuscous or dark fuscous, suffusedly irrorated with white, especially towards costa anteriorly; first line straight, whitish, edged posteriorly by a streak of dark suffusion; sometimes a faint darker discal dot; second line whitish, obscurely dark-edged, very faint or usually wholly obsolete. Hindwings pale grey; veins and terminal line dark grey.

21 specimens; 8 Kona, Hawaii, from 1500 to 4000 feet; 5 Olaa, Hawaii; 5 Molokai, from 3000 to 3500 feet; 2 Waianae Mts., Oahu, at 2000 feet; 1 Waimea Mts., Kauai, at 4000 feet; from April to June, and in August and September. Also 5 specimens received from Mr Blackburn, from Oahu and Hawaii.

(2) *Homoeosoma amphibola*, sp. nov.

♂♀. 16—22 mm. Head, palpi, and thorax fuscous, irrorated with white. Forewings very narrow, posteriorly somewhat dilated; veins 4 and 5 stalked; fuscous or dark fuscous, irrorated with white; first line almost straight, whitish, edged posteriorly by a dark fuscous fascia; a well-defined dark fuscous discal spot; second line almost straight, whitish, dark-edged, always distinct; cilia fuscous, irrorated with whitish. Hindwings pale grey; veins and terminal line dark grey. (Plate V. fig. 12.)

33 specimens; 25 Kaholuamano, Kauai, at 4000 feet; 8 Waimea Mts., Kauai, at 4000 feet; from April to June. Exceedingly similar to the preceding, but constantly distinguished by the neuration, and also by the well-marked second line of forewings. It also closely approaches the Australian *H. vagella*, but may be separated by the nearly straight first line, which in that species is angulated.

GALLERIADAE.

MELIPHORA *Guen.*

(1) *Meliphora grisella* Fab.

1 specimen, Kona, Hawaii, at 1400 feet, in September. Also taken by Mr Blackburn. Occurs in Europe, N. America, and Australia.

CRAMBIDAE.

EUCHROMIUS *Guen.*

(1) *Euchromius ocelleus* Haw. (*bella* Butl., non Hüb.).

2 specimens; 1 Makaweli, Kauai, at sea-level; 1 Molokai; in May. Also previously recorded. Native in S. Europe, but now occurs in America and Australia also.

PRIONOPTERYX *Steph.*

(1) *Prionopteryx exonoma*, sp. nov.

♀. 12 mm. Head and thorax brown. Forewings elongate, termen with a deep upwards-oblique semioval excavation below middle; 4 absent, 7 absent, 9 absent, 11 free; brown, slightly coppery-tinged; first and second lines fine, white, blackish-edged, first preceded towards costa by broader blackish suffusion, acutely angulated outwards above middle and inwards towards dorsum, between these irregular, second obtusely angulated outwards above middle and inwards towards dorsum; a median blackish shade on costal half parallel to these; a very small white wedgeshaped mark on costa before apex; four undefined dashes of blackish suffusion towards termen; cilia fuscous, with a black line interrupted on excavation, and a white basal mark at apex. Hindwings with vein 4 absent; dark grey, suffused with blackish-fuscous towards termen, slightly purplish-tinged; cilia grey, with blackish subbasal line, tips whitish. (Plate V. fig. 13.)

1 specimen, Waianae Mts., Oahu, at 2000 feet, in April. Distinct by the small size and peculiar neuration (which varies specifically in this genus); in the latter character it approaches nearest the Australian *P. apicistrigella*, to which, however, in other respects it is but little allied.

TALIS *Guen.*

1. First line distinct, subsinuate ....(*6*) *floricolans.*
,, angulated near costa or obsolete ....2.
2. Forewings very elongate (Kauai species) ....(*1*) *geralea.*
,, shorter..3.
3. Forewings grey..(*5*) *hyacinthina.*
,, ochreous or brownish ....4.
4. Forewings with dark tornal spot in cilia..(*4*) *oxyptera.*
,, without such spot ....5.
5. Lines more or less distinct ....(*3*) *hydrophila.*
,, absent..(*2*) *homodora.*

(1) *Talis geralea*, sp. nov.

♂♀. 12—17 mm. Palpi 5. Forewings very elongate-triangular, narrower than in the other native species, apex in ♂ obtuse, in ♀ round-pointed, termen straight, oblique, in ♀ very oblique; brownish-ochreous or light fuscous, more or less whitish-sprinkled, in ♀ sometimes much suffused with white; a very few scattered black scales; two dark fuscous discal dots transversely placed, sometimes faint; second line darker, usually faint or absent, sometimes marked with some black scales, curved, indented near dorsum; an indistinct interrupted dark terminal line. Hindwings fuscous. (Plate V. fig. 14.)

7 specimens; 3 Waimea Mts., Kauai, at 4000 feet; 4 Makaweli, Kauai, sea-level; in May and June. Differs from all the rest by the more elongate forewings; the whitish irroration and indistinct or absent second line are also characteristic.

(2) *Talis homodora*, sp. nov.

♂. 12—14 mm. Palpi 5. Forewings elongate-triangular, apex round-pointed, termen straight, oblique; whitish-ochreous or pale brownish-ochreous, irrorated with fuscous; a few scattered black scales; two blackish discal dots transversely placed; second line absent; an indistinct interrupted darker terminal line. Hindwings fuscous.

8 specimens, Waianae Mts., Oahu, at 3000 feet, in April. Characterised by the uniform colouring, and entire absence of lines.

(3) *Talis hydrophila* Butler.

Scotomera hydrophila Butl. Trans. Ent. Soc. Lond. 1882, p. 36.
Hednota hydrophila Meyr. Trans. Ent. Soc. Lond. 1888, p. 242.

♂♀. 11—14 mm. Palpi 4. Forewings elongate-triangular, apex obtuse, termen straight, oblique; brownish-ochreous, irrorated with dark brown; first and second lines dark brown, sometimes indistinct, first angulated outwards above middle and inwards below middle, second rather strongly curved, indented near dorsum; two dark fuscous or blackish discal dots transversely placed; a terminal series of dark fuscous or blackish dots. Hindwings fuscous or dark fuscous.

13 specimens; 7 Kona, Hawaii, at 4000 feet; 6 Molokai, from 3000 to 3500 feet; from May to July. According to Mr Blackburn also from Oahu, but perhaps by confusion with others. Distinguished by the dark brownish colouring, and peculiar form of the first line.

(4) *Talis oxyptera* Meyr.

Hednota oxyptera Meyr. Trans. Ent. Soc. Lond. 1888, p. 243.

Only one specimen sent, a ♀ of 11 mm., from Waianae Mts., Oahu, "on plains," in April. My examples were from Honolulu, Oahu, where I found it common in dry grassy places in August. Especially characterised by the ochreous colouring and distinct darker ochreous lines (first curved outwards on upper $\frac{2}{3}$, second moderately curved), and particularly by the dark tornal spot in cilia of forewings.

(5) *Talis hyacinthina*, sp. nov.

♂♀. 13—16 mm. Palpi 4. Forewings elongate-triangular, apex obtuse, termen nearly straight, oblique; grey, more or less irrorated with white and dark grey, sometimes mixed with yellow towards base; a few scattered black scales; first and second lines usually more or less ochreous-yellow, first angulated near costa, sometimes obsolete, second marked with black scales, gently curved, sinuate inwards towards dorsum; two black discal dots transversely placed; an interrupted blackish terminal line. Hindwings grey or dark grey. (Plate V. fig. 15.)

8 specimens, Kona, Hawaii, from 4000 to 8000 feet, from June to August. Always separable from its nearest allies by the grey colouring; the yellow lines are very characteristic when present, but are not always well-developed.

(6) *Talis floricolans* Butler.

Gesneria floricolens Butl. Ent. Mo. Mag. XIX. p. 180.

Hednota floricolans Meyr. Trans. Ent. Soc. Lond. 1888, p. 242.

This is the most distinct species of the group, recognisable by the shorter palpi, forewings whitish mixed with fuscous, first line very distinct, only slightly sinuate, brown mixed with black, preceded by whitish suffusion, second distinct, ochreous more or less mixed with brown and black, strongly curved on upper $\frac{2}{3}$. (Plate V. fig. 16.)

12 specimens; 8 Molokai; 3 Waianae Mts., Oahu, "on plains"; 1 Waialua, Oahu, sea-level; from March to May. According to Mr Blackburn also from Lanai. In this species (as in the others) veins 4 and 5 of the hindwings are normally approximated at base, the stalking recorded by me being exceptional.

PYRAUSTIDAE.

NYMPHULA *Schranck*.

(1) *Nymphula fluctuosalis* Zell. (*linealis* Guen.).

Oligostigma curta Butl. Ent. Mo. Mag. XV. p. 270.

14 specimens; 13 Wailuku, Maui; 1 Waialua, Oahu; in October and November. Occurs also in Asia, Africa, and Australia.

MARGARONIA *Hüb.*

(1) *Margaronia exaula* Meyr.

Margarodes exaula Meyr. Trans. Ent. Soc. Lond. 1888, p. 213.

Margaronia glauculalis Butl. Ann. Mag. Nat. Hist. (5) VII. 1881, p. 327 (non Guen.).

♂♀. 40—51 mm. Description may be supplemented as follows: Maxillary palpi orange, tips white; forewings with orange costal streak variable in breadth basally, and sometimes extended finely to apex; cilia pale orange, sometimes greyish-tinged, base white.

5 specimens; 3 Molokai, at 3000 feet; 1 Lahaina, Maui; 1 unlabelled; in June. Also recorded by Mr Blackburn from Honolulu, Oahu. The species is at once distinguished from *M. nereis* Meyr. by the entire absence of orange marking on face, and from *M. glauculalis* Guen. (*marthesiusalis* Walk.) by the pale orange cilia.

(2) *Margaronia cyanomichla*, sp. nov.

♂♀. 26—28 mm. Head and thorax fuscous, sometimes whitish-mixed. Palpi dark fuscous, lower half white. Forewings light fuscous or whitish, more or less tinged or wholly suffused with bright bluish-purple, sometimes forming whitish blotches on costal half between fasciae; five dull orange fasciae (in ♂ much suffused with whitish), edged with dark fuscous, first two rather oblique, third median, including a dark fuscous transverse mark above middle, connected with fourth by a slender downward-oblique bar below middle, fourth gently curved, obsolete on dorsum, fifth broader, terminal; a dark fuscous dot below costa between second and third; cilia fuscous-whitish, with a dark fuscous subbasal line. Hindwings with groundcolour and fourth and fifth fasciae as in forewings, but fourth fascia almost straight, fifth narrowed to a point at tornus; a dark fuscous discal mark, beneath which is sometimes a small orange spot; cilia as in forewings. (Plate V. fig. 17.)

5 specimens; 2 Waimea Mts., Kauai, at 4000 feet; 2 Kaholuamano, Kauai; 1 Molokai Mts.; from April to August. The only male is the Molokai specimen, and is in very poor condition; its more whitish colouring may possibly be rather individual than sexual.

OMIODES *Guen.*

1. Forewings with veins marked by pale lines .... 2.
„ „ not marked by pale lines .... 5.
2. Second line with acute projection outwards .... (*1*) *blackburni*.
„ without acute projection outwards .... 3.
3. First line indicated by dark shade .... 4.
„ „ by dark dots only .... (*7*) *telegrapha*.
4. Second line very obtusely angulated below middle .... (*5*) *epicentra*.
„ not angulated........................ (*8*) *accepta*.
5. Forewings ochreous or ferruginous .... 6.
„ fuscous .... 7.

6. Orbicular and discal spots well-marked ....(*11*) *demaratalis.*
,, ,, absent ....(*10*) *monogramma.*
7. Hindwings with postmedian line angulated or bent in middle ....8.
,, ,, almost straight ....10.
8. Median band of forewings darker ....9.
,, ,, not darker ....(*13*) *localis.*
9. Forewings with second line obsolete ....(*3*) *asaphombra.*
,, ,, sharply marked ....(*2*) *euryprora.*
10. Postmedian line of hindwings white ....11.
,, ,, not white ....12.
11. Second line of forewings projecting inwards below middle ....(*12*) *monogona.*
,, ,, without projection ....(*9*) *continuatalis.*
12. First line followed by rectangularly bent blackish streak......................(*6*) *anastrepta.*
,, not so followed ....(*4*) *iridias.*

(1) *Omiodes blackburni* Butl.

Botys blackburni Butl. Ent. Mo. Mag. XIV. p. 48.
Omiodes blackburni Meyr. Trans. Ent. Soc. Lond. 1888, p. 214.

♂♀. 30—37 mm. Sufficiently described by me (l. c.); but in one female from Lanai the groundcolour of both wings is mostly suffused with rather dark fuscous.

17 specimens; 7 Olaa, Hawaii, at 2000 feet; 5 Lahaina, Maui, on coast; 1 Honolulu, Oahu; 2 Lanai, at 3000 feet; 1 Makaweli, Kauai, on coast; 1 Waimea Mts., Kauai, at 4000 feet; in June, July, and November. Bred from larvae feeding on the banana (*Musa*), to which it is very destructive.

(2) *Omiodes euryprora*, sp. nov.

♂♀. 31—33 mm. Head, thorax, and abdomen fuscous. Palpi dark fuscous, lower half white. Legs dark fuscous, tarsi white. Forewings long, apex subacute, termen rather strongly sinuate; fuscous, purplish-tinged, irregularly sprinkled with whitish; a sharply-defined blackish-fuscous very broad median band, not reaching costa, anteriorly edged by lower portion of faintly marked angulated first line, anterior half of upper edge excavated, with a blackish orbicular dot in middle of excavation, posterior edge margined by whitish second line, forming a strong obtuse prominence in middle; a terminal series of blackish-fuscous dots. Hindwings fuscous, darker posteriorly; an obscure paler postmedian line, angulated in middle. (Plate V. fig. 18.)

3 specimens; 2 Olaa, Hawaii, at 2000 feet, in June and November; 1 Hilo, Hawaii, at 2000 feet, in January.

(3) *Omiodes asaphombra*, sp. nov.

♂. 35 mm. Head, thorax, and abdomen fuscous. Palpi fuscous, lower half white. Forewings long, termen slightly sinuate; fuscous, somewhat mixed with whitish and darker; a very broad dark fuscous median band mixed with ferruginous, not reaching costa, anterior edge straight, anterior half of upper edge excavated, with a dark fuscous orbicular dot in excavation before middle, posterior edge wholly suffused and undefined; a terminal series of dark fuscous dots. Hindwings rather dark fuscous; a slightly paler postmedian shade, darker-edged, obtusely angulated in middle.

1 specimen, Waimea Mts., Kauai, at 4000 feet, in May.

(4) *Omiodes iridias*, sp. nov.

♂♀. 27—28 mm. Head and thorax dark fuscous, with white line above eyes. Palpi dark fuscous, lower half white. Forewings rather long, termen slightly sinuate beneath apex; dark fuscous, irrorated with dull purplish; lines obscurely paler, first obtusely angulated above middle, obsolete on costa, second very obtusely angulated below middle, straight or slightly curved on upper portion, sinuate inwards below angulation; enclosed median band in ♂ hardly darker, somewhat ferruginous-mixed on dorsal half, in ♀ blackish except towards costa, upper edge excavated on anterior half, with a blackish orbicular dot in excavation before middle; a terminal series of dark fuscous or blackish dots: cilia fuscous, with darker subbasal line. Hindwings rather dark fuscous; an obscurely paler slightly sinuate postmedian line, anteriorly darker-edged; cilia as in forewings. (Plate V. fig. 19.)

2 specimens, Kilauea, Hawaii, in August.

(5) *Omiodes epicentra*, sp. nov.

♂♀. 25—26 mm. Head, thorax, and abdomen whitish-ochreous mixed with brownish, segmental margins narrowly whitish, anal tuft mixed with dark fuscous. Palpi dark fuscous, lower half white. Forewings moderate, termen bowed; pale ochreous, irregularly mixed with whitish and sprinkled with dark fuscous; veins indistinctly whitish; first line dark fuscous, very acutely angulated in middle, upper portion indistinct, lower strongly marked and followed by a brownish-ochreous suffusion; a blackish orbicular dot; two dark fuscous discal dots transversely placed, followed by an oblique brownish-ochreous suffusion; second line whitish, edged with dark fuscous, with very slight and obtuse angulation below middle; a terminal series of blackish triangular dots. Hindwings grey, darker-sprinkled; a blackish discal dot; a straight whitish postmedian line, edged anteriorly with dark fuscous, and posteriorly by a cloudy dark fuscous suffusion; an interrupted blackish terminal line.

3 specimens, Waialua, Oahu, on plains, in March.

(6) *Omiodes anastrepta*, sp. nov.

♀. 28—29 mm. Head, thorax, and abdomen fuscous. Palpi dark fuscous, lower half white. Forewings moderate, termen faintly sinuate beneath apex; rather dark fuscous, more or less whitish-sprinkled; first line whitish, angulated above middle, nearly or quite obsolete above angulation, lower portion margined posteriorly by a thick blackish-fuscous streak which is nearly rectangularly bent and continued beneath median vein to discal mark, this angle sometimes filled with dark suffusion; a small black orbicular dot; a transverse blackish discal mark; second line whitish, slightly sinuate beneath costa, edged posteriorly by a suffused dark fuscous band, and sometimes anteriorly by a series of dark fuscous dots; a terminal series of blackish dots. Hindwings rather dark grey; a paler slightly sinuate postmedian line, edged anteriorly with dark grey dots, and posteriorly by a band of dark grey suffusion; a terminal series of blackish dots.

2 specimens; 1 Kona, Hawaii, at 4000 feet, in September; 1 Molokai Mts. (forest above Pelekuna), in August.

(7) *Omiodes telegrapha*, sp. nov.

♂. 40 mm. Head and thorax ochreous-yellowish. Palpi yellow-brownish, lower half whitish. Forewings long, termen sinuate beneath subacute apex; light ochreous-yellowish, slightly blackish-sprinkled, veins partially white; first line very acutely angulated above middle, only indicated by several blackish dots between veins; second line cloudy, blackish, interrupted by veins, almost straight; an almost terminal series of blackish dots, preceded by white dashes. Hindwings grey, veins whitish; a dark grey discal dot; a straight whitish postmedian line, edged anteriorly narrowly, and posteriorly more broadly with dark grey suffusion; a terminal series of black dots preceded by white dashes. (Plate V. fig. 20.)

1 specimen, Olaa, Hawaii, in September.

(8) *Omiodes accepta* Butl.

Botys accepta Butl. Ent. Mo. Mag. XIV. p. 49.
Omiodes accepta Meyr. Trans. Ent. Soc. Lond. 1888, p. 214.

♂♀. 22—33 mm. Sufficiently described by me (l. c.).

16 specimens; 6 Hilo, Hawaii, at 2000 feet; 4 Kona, Hawaii, from 1500 to 4000 feet; 1 Haleakala, Maui, at 5000 feet; 1 Molokai, at 3000 feet; 3 Kaholuamano, Kauai, at 4000 feet; 1 Waimea Mts., Kauai, at 4000 feet; in December and January, and from April to September.

(9) *Omiodes continuatalis* Wall.

Salbia continuatalis Wall. Wien. Ent. Mon. 1860, p. 175.
Botys continuatalis Butl. Ent. Mo. Mag. xv. p. 270.
Omiodes continuatalis Meyr. Trans. Ent. Soc. Lond. 1888, p. 215.

♂♀. 26—32 mm. Sufficiently described by me (l. c.).

30 specimens; 4 Kona, Hawaii, from 2000 to 4000 feet; 12 Waianae Mts., Oahu; 3 Waialua, Oahu, on coast; 6 Lanai, from 2000 to 3000 feet; 1 Molokai Mts.; 3 Kaholuamano, Kauai, at 4000 feet; 1 Waimea Mts., Kauai, at 4000 feet; from February to June, and in September.

(10) *Omiodes monogramma*, sp. nov.

♂. 25—29 mm. Head and palpi deep ferruginous, lower half of palpi white. Thorax ferruginous, posteriorly paler and mixed with whitish-ochreous. Abdomen ferruginous-ochreous, segmental margins usually finely white. Forewings moderate, termen gently bowed; ferruginous; costa suffused with dark fuscous from base to $\frac{3}{5}$; second line about $\frac{3}{4}$, almost straight, white, obsolete on costa, posteriorly edged with fuscous suffusion; a dark fuscous terminal line: cilia grey, with darker subbasal line. Hindwings fuscous, usually suffused with dull ochreous towards dorsum; a white postmedian line, obtusely angulated near tornus, posteriorly edged with dark fuscous suffusion, beyond which the terminal area is wholly ferruginous-ochreous; a dark fuscous terminal line; cilia whitish, with dark grey subbasal line. (Plate V. fig. 21.)

5 specimens; 2 Waianae Mts., Oahu; 3 Waimea Mts., Kauai, at 4000 feet; from April to June. Allied to *O. demaratalis*, but differs by the larger size, ferruginous colouring, absence of orbicular and discal dots, second line of forewings placed nearer termen, and postmedian line of hindwings obtusely angulated and followed by dark fuscous suffusion.

(11) *Omiodes demaratalis* Walk.

Botys demaratalis Walk. Cat. xix. p. 1009.
Omiodes demaratalis Meyr. Trans. Ent. Soc. Lond. 1888, p. 216.

Sufficiently described.

22 specimens; 13 Waianae Mts., Oahu; 8 Waimea Mts., Kauai, at 4000 feet; 1 Kona, Hawaii, at 2000 feet; from April to June and in September. Also recorded from Honolulu, Oahu, where I took it in August.

(12) *Omiodes monogona* Meyr.

Omiodes monogona Meyr. Trans. Ent. Soc. Lond. 1888, p. 216. *O. liodyta*, ib. 217.

♂♀. 17—28 mm. The second line of forewings varies in form to some extent, covering both descriptions, and also in breadth, being sometimes thick and suffused posteriorly. The types from which my two descriptions were drawn are now seen to belong certainly to the same species; however the two examples of *O. liodyta* remain peculiar in respect of size, as none of Mr Perkins' specimens are below 22 mm.

21 specimens; 4 Olaa, Hawaii; 2 Kona, Hawaii, at 4000 feet; 2 Waianae Mts., Oahu, at 1700 feet; 12 Kaholuamano, Kauai, at 4000 feet; 1 Waimea Mts., Kauai, at 4000 feet; in April, from June to August, and in December.

(13) *Omiodes localis* Butl.

Botys localis Butl. Ent. Mo. Mag. xv. p. 271.
Omiodes localis Meyr. Trans. Ent. Soc. Lond. 1888, p. 217.

Sufficiently described by me (l. c.).

35 specimens; 12 Kona, Hawaii, from 2000 to 4000 feet; 7 Waianae Mts., Oahu, from 1700 to 3000 feet; 1 Molokai, at 3000 feet; 2 Lanai, at 2000 feet; 2 Waimea Mts., Kauai, at 4000 feet; 11 Kaholuamano, Kauai, at 4000 feet; from February to September.

HYMENIA *Hüb.*

(1) *Hymenia recurvalis* Fab. (*fascialis* Cram.).

20 specimens; 7 Kona, Hawaii, at 1500 feet; 1 Olaa, Hawaii; 10 Waialua, Oahu, on plains; 2 Honolulu, Oahu; from March to June. Occurs in Asia, Africa, and Australia.

PHLYCTAENIA *Hüb.*

1. Forewings with second line almost straight ....(24) *heterodoxa.*
„ „ more or less broken ....2.
2. Groundcolour of median band white ....(11) *eucrena.*
„ „ not white..........................3.
3. Forewings with sharply marked white spots ....4.
„ sometimes partly whitish-suffused, but without sharp white spots ....6.

4. Forewings with white or yellowish discal spot beyond white median spot ......5.
„ without such discal spot ......(*1*) *calliastra.*
5. Cilia sharply barred with whitish ......(*3*) *synastra.*
„ not or indistinctly whitish-dotted ......(*2*) *hyacinthias.*
6. Forewings suffused with shining brassy-yellowish ......(*4*) *chalcophanes.*
„ not brassy-yellowish ......7.
7. Hindwings whitish, without grey suffusion ......8.
„ terminally or wholly grey ......10.
8. Palpi 3½—4 ......(*23*) *pyranthes.*
„ 2½—3 ......9.
9. Forewings with costa posteriorly dotted with dark fuscous ......(*20*) *liopis.*
„ „ not dotted with dark fuscous......(*22*) *rhodias.*
10. First line whitish or ochreous, nearly straight, partly or wholly double ......11.
„ more or less bent, seldom whitish ......13.
11. Forewings with ferruginous-orange costal streak throughout......(*9*) *iocrossa.*
„ without such streak......12.
12. Forewings with reddish-ochreous costal patch beyond second line ......(*10*) *micacea.*
„ without such patch ......(*8*) *nigrescens.*
13. Forewings with dark fuscous subcostal spot beyond second line ......(*13*) *metasema.*
„ without such spot ......14.
14. Groundcolour suffused with ferruginous ......15.
„ not ferruginous ......17.
15. Forewings with discal spot white ......(*14*) *ommatias.*
„ „ not white......16.
16. Orbicular and discal spots separated by yellow or orange spot ......(*21*) *endopyra.*
„ „ not separated by yellow spot ......(*19*) *despecta.*
17. Forewings with pale or whitish suffusion beyond discal spot......18.
„ without such suffusion ......20.
18. First line indicated by broad pale fascia, narrowed costally ......(*7*) *monticolans.*
„ not so formed ......19.
19. Forewings anteriorly with costal ¾ dark, dorsal ¼ pale ......(*6*) *ephippias.*
„ with these areas not contrasted......(*12*) *platyleuca.*
20. Groundcolour uniformly dark ......21.
„ much mixed with pale ......(*5*) *chytropa.*
21. First line very thick, strongly marked ......(*16*) *pachygramma.*
„ not very thick ......22.
22. Second line more or less whitish-edged posteriorly......23.
„ not whitish-edged......(*18*) *argoscelis.*
23. Palpi whitish towards base beneath ......(*15*) *caminopis.*
„ wholly dark fuscous ......(*17*) *ennychioides.*

(1) *Phlyctaenia calliastra*, sp. nov.

♂♀. 20—23 mm. Head dark fuscous, with white lateral line. Palpi 2, dark fuscous, basal and second joints white beneath except at apex, more or less yellow-suffused. Thorax dark fuscous, two sometimes connected spots behind collar, a mark on posterior margin, and sometimes a spot in middle of collar yellowish, and a spot on each side of back white. Abdomen dark fuscous, segmental margins white in middle of back and on sides. Legs dark fuscous, ringed and banded with white, posterior tibiae banded with yellowish. Forewings dark fuscous, sometimes with some yellowish scales beneath costa ; markings snow-white ; a basal median dot, another beyond it, a straight series of three small spots representing first line, two dots beyond this near costa and dorsum, a subquadrate spot in middle of disc, and two dots transversely placed beyond this ; second line represented by two connected spots beneath costa, a series of two or three dots below middle nearer termen, and a series of three small subconfluent spots on dorsal third nearer base ; a series of quadrate dots along termen and posterior half of costa ; cilia dark fuscous, apical half spotted with white. Hindwings dark fuscous ; apical half of cilia spotted with whitish.

8 specimens ; 4 Kaholuamano, Kauai, at 4000 feet ; 4 Mts. Waimea, Kauai, at 4000 feet ; from April to June.

(2) *Phlyctaenia hyacinthias*, sp. nov.

♂♀. 24—27 mm. Head blackish, with a white lateral line, back of crown sometimes ochreous-yellow. Palpi 2¼, basal and second joints ochreous-yellow beneath except at apex. Thorax blackish, with an ochreous-yellow spot on shoulder, two ochreous-yellow spots behind collar and one in middle of back sometimes confluent, a white spot on each side of back, and white posterior mark. Abdomen blackish, sides yellowish-mixed, segmental margins white. Legs blackish, tarsi ringed with white, middle and posterior tibiae broadly banded with yellowish. Forewings dark fuscous ; a subbasal transverse series of four dots, second white, rest ochreous-yellow ; an ochreous-yellow dorsal spot before first line ; first line ochreous-yellow, interrupted near costa by a group of three white dots, angulated inwards on lower half, followed by a spot of white and yellow scales opposite angulation ; sometimes a streak of ochreous-yellow scales strewn beneath costa from first to second line ; dot-like orbicular and oval discal spot ochreous-yellow ; a transverse white spot between these, sometimes divided into two, and two white dots transversely placed beyond discal ; second line represented by two connected white marks beneath costa, a series of two or three dots below middle nearer termen, and a series of three connected marks on dorsal third nearer base ; sometimes a subterminal streak of ochreous-yellow scales ; five white dots on posterior half of costa, yellowish beneath ; a terminal series of white dots, sometimes almost obsolete ; cilia dark fuscous, sometimes with indistinct whitish dots on apical half. Hindwings dark fuscous ; two obliquely placed darker discal dots ; cilia as in forewings. (Plate V. fig. 22.)

12 specimens, Haleakala, Maui, at 5000 feet, from March to May.

(3) *Phlyctaenia synastra*, sp. nov.

♂♀. 15—21 mm. Head dark fuscous, with a white lateral line, back of crown sometimes ochreous-yellow. Palpi 2, black, basal and second joints white beneath except at apex. Thorax dark fuscous, with two ochreous-yellow spots behind collar and sometimes one in middle of back, sometimes confluent, a white spot on each side of back, and white posterior mark. Abdomen dark fuscous, sides yellowish-mixed, segmental margins white. Legs blackish, tarsi ringed with white, middle tibiae variably or hardly pale-banded or with terminal half white, posterior tibiae broadly banded with whitish-yellowish. Forewings dark fuscous, sometimes variably strewn with whitish and yellowish scales; a subbasal transverse series of three dots, second white, others yellowish; first line white, sometimes partly yellowish-tinged, irregular, interrupted above middle, dilated in middle, sinuate inwards on lower half, followed by two white dots above middle and one (sometimes yellow) below middle; dot-like orbicular and oval discal spot yellow or whitish; a narrow transverse white spot between these, seldom reduced to several dots, and two white dots transversely placed beyond discal; second line white, somewhat indented near costa, broken inwards below middle, usually interrupted to form three separate groups of subconfluent spots; sometimes a subterminal streak of pale yellowish scales; five white or yellowish dots on posterior half of costa; a terminal series of white dots; cilia dark fuscous, apical half spotted with whitish. Hindwings fuscous or dark fuscous, disc in ♂ sometimes suffused with whitish; two obliquely placed darker discal dots; an indistinct pale waved postmedian line; cilia fuscous, apical half more or less whitish.

15 specimens; 12 Olaa, Hawaii; 2 Kona, Hawaii, at 2000—4000 feet; 1 Waianae Mts., Oahu, at 2000 feet; in April, June, July, September, and November.

(4) *Phlyctaenia chalcophanes*, sp. nov.

♂♀. 21—24 mm. Head, palpi, and thorax pale ochreous-yellow sprinkled with black, back of crown deeper ochreous-yellow, palpi 2½. Abdomen black mixed with pale yellow, segmental margins white. Legs black ringed with pale yellowish, posterior tibiae suffused with whitish-yellowish. Forewings blackish, mixed with ochreous-yellow; markings shining whitish-yellow, with prismatic reflections; basal and subbasal spots, sometimes confluent and enlarged; first line slender, irregular, followed by a partially confluent fascia, not reaching costa; an oval blackish spot containing a pale mark representing orbicular, separated by a transverse spot connected beneath with preceding fascia from a subquadrate blackish discal spot containing two pale dots; second line waved, sharply indented beneath costa, middle third curved outwards, preceded by a suffused fascia confluent above and below middle; subterminal line slender, sharply dentate, teeth touching termen, limiting a series of triangular black terminal spots; cilia fuscous, on apical half suffusedly spotted with whitish-yellowish.

Hindwings rather dark fuscous; two obliquely placed darker discal dots; cilia as in forewings. (Plate V. fig. 23.)

22 specimens; 20 Olaa, Hawaii, at 2000 feet; 2 Hilo, Hawaii, at 2000 feet; in January, September, and November.

(5) *Phlyctaenia chytropa*, sp. nov.

♀. 18—21 mm. Head, palpi, and thorax whitish-ochreous irrorated with dark fuscous, palpi 2½. Abdomen dark grey, segmental margins ochreous-whitish. Legs dark fuscous, ringed with whitish, middle tibiae suffusedly banded with whitish or with terminal half wholly white, posterior tibiae mostly suffused with whitish. Forewings dark fuscous, irregularly and suffusedly mixed with whitish and whitish-ochreous; a subbasal spot of dark suffusion; first line irregular, obscurely pale, anteriorly suffused, posteriorly dark-edged; quadrate orbicular and 8-shaped discal spot dark-suffused; second line whitish, anteriorly black-edged, posteriorly partly edged with dark suffusion, middle third curved outwards; subterminal line obscurely indicated by whitish suffusion; three indistinct blackish spots before termen in middle; a series of blackish spots along termen and posterior half of costa; cilia fuscous, apical half spotted with whitish. Hindwings fuscous or rather dark fuscous, darker posteriorly; two obliquely placed darker discal dots; cilia as in forewings.

2 specimens; 1 Mts. Waimea, Kauai, at 4000 feet; 1 Waianae Mts., Oahu, at 2000 feet; in April and May.

(6) *Phlyctaenia ephippias*, sp. nov.

♂. 19—24 mm. Head and thorax light ochreous-yellowish irrorated with black, thorax with small white central spot. Palpi 2, blackish, sprinkled with pale yellowish. Abdomen dark grey. Legs blackish, ringed with white, posterior tibiae suffused with white. Forewings dull fuscous-purplish, densely irregularly irrorated with dark fuscous and light yellowish; a darker blotch occupying costal ¾ from base to end of discal spot, leaving dorsal fourth more yellowish; an undefined white median basal dot; first line dark fuscous, bent in middle, interrupted above middle and on costa; round orbicular and 8-shaped discal spot outlined with dark fuscous, with a few white scales between them; an undefined spot of whitish scales below discal spot; space between discal spot and second line irregularly suffused with pale yellowish; second line pale yellowish, anteriorly edged with dark fuscous, slightly waved, sinuate-curved outwards to near termen above tornus, indistinct in disc, rectangularly broken inwards to beneath discal spot, towards costa marked with a white dot; a dark fuscous terminal line marked with white dots; cilia light fuscous mixed with whitish, with a dark fuscous line, and obscurely spotted with dark fuscous. Hindwings fuscous; two obliquely placed darker discal dots; cilia as in forewings. (Plate V. fig. 24.)

4 specimens, Mts. Waimea, Kauai, at 4000 feet, in May and June.

(7) *Phlyctaenia monticolans* Butl.

Locastra monticolens Butl. Trans. Ent. Soc. Lond. 1882, p. 34.
Scopula monticolans Meyr. Op. id. 1888, p. 219.

♂♀. 21—25 mm. Head, palpi, and thorax blackish, sprinkled with ferruginous or whitish; thorax crested, with a spot on each side of back and a posterior spot whitish; palpi 1½—1¾. Abdomen dark fuscous, segmental margins whitish. Legs dark fuscous, ringed with white, posterior tibiae suffused with whitish. Forewings dark fuscous, variably mixed or irrorated with black, reddish-ochreous, and white, sometimes from subbasal to second line wholly suffused with reddish-ochreous or prismatic white; a more or less developed straight black subbasal line or fascia; first line thick, black, slightly curved, sometimes broadly interrupted below middle; roundish orbicular and oblong-oval discal spot outlined with black (in one specimen almost obsolete); second line more or less whitish, anteriorly black-edged, waved, suddenly indented near costa, curved outwards to rather near termen, at ⅜ abruptly broken inwards to beneath discal spot; a series of large semioval dark fuscous dots along termen and apical portion of costa, alternating with white dots, sometimes obsolete: cilia dark fuscous, apical half spotted with whitish. Hindwings rather dark fuscous, darker terminally; two obliquely placed darker discal dots; cilia as in forewings.

17 specimens; 4 Olaa, Hawaii, at 2000 feet; 1 Panoa Valley, Oahu, at 1500 feet; 10 Kaholuamano, Kauai, at 4000 feet; 2 Mts. Waimea, Kauai, at 4000 feet; from March to June, and in November. Mr Blackburn's specimens were from near Honolulu, at 1500 feet. I have redescribed this species, as my former description did not cover the considerable range of variation now shown to exist.

(8) *Phlyctaenia nigrescens* Butl.

Mecyna nigrescens Butl. Ann. Mag. Nat. Hist. (5) VII. 1881, p. 328.
Melanomecyna nigrescens id. Ent. Mo. Mag. XIX. p. 179.
Scopula nigrescens Meyr. Trans. Ent. Soc. Lond. 1888, p. 220.

♂♀. 14—18 mm. Head and thorax dark fuscous mixed with pale ochreous. Palpi 2—2¼, dark fuscous mixed with whitish. Abdomen dark fuscous, segmental margins white. Legs dark fuscous ringed with white, posterior tibiae suffused with whitish. Forewings fuscous, with coppery reflections, variably mixed with dark fuscous, whitish-ochreous, and whitish; first line black, preceded by whitish suffusion, lower half strong and touching orbicular beneath, upper half reduced to an indistinct mark beneath costa; roundish orbicular and 8-shaped discal spot black-outlined, space between them often pale; discal spot followed by a conspicuous white suffusion, variable in extent; second line white, anteriorly black-edged, sinuate-curved to rather near tornus, at $\frac{2}{3}$ abruptly broken inwards to beneath discal spot, near below which it emits a short black tooth inwards; posterior half of costa spotted with blackish, alternating with two or more whitish-ochreous spots; a terminal series of round blackish dots: cilia dark fuscous, apical half spotted with whitish. Hindwings rather dark fuscous, with darker terminal band; two obliquely placed darker discal dots; cilia dark fuscous, apical half whitish.

20 specimens; 4 Kona, Hawaii, from 1500 to 5000 feet; 1 Waianae Mts., Oahu, at 2000 feet; 3 Molokai, at 3000 feet; 1 Haleakala, Maui, at 5000 feet; 1 Wailuku, Maui; 10 Kaholuamano, Kauai, at 4000 feet; from April to August. Also twenty specimens received from Mr Blackburn; the original type-specimen was from Haleakala.

(9) *Phlyctaenia iocrossa*, sp. nov.

♂. 20—25 mm. Head, palpi, and thorax dark fuscous, sometimes much mixed with ferruginous, thorax with more or less developed central yellowish spot and sometimes white posterior mark, palpi $2\frac{1}{2}$. Abdomen dark fuscous, towards apex ferruginous-marked, segmental margins white. Legs dark fuscous, ringed with whitish, posterior tibiae whitish above. Forewings rather dark fuscous, slightly purplish-tinged; a more or less defined streak of ferruginous-orange suffusion along costa from base to apex, posteriorly marked with four quadrate dark fuscous costal spots; a white median subbasal dot; first line thick, straight, vertical, whitish-orange, beneath costal streak forming a quadrate white spot enclosing a dark fuscous dot or mark; a whitish longitudinal dash before second line above middle, and a whitish dot above this; sometimes some orange suffusion towards middle of dorsum; second line slender, whitish-orange, anteriorly darker-edged, marked with white beneath costal streak, middle third curved outwards, indistinct or nearly obsolete; sometimes a whitish suffusion between veins towards termen; a terminal series of indistinct dark fuscous spots separated by pale or whitish dots: cilia dark fuscous. Hindwings rather dark fuscous; two obliquely placed darker discal dots, and sometimes a faint second line; cilia dark fuscous, apical half paler. (Plate V. fig. 25.)

6 specimens; 4 Olaa, Hawaii, at 2000 feet; 1 Hilo, Hawaii, at 2000 feet; 1 Molokai, at 4000 feet; in January, June, September, and November.

(10) *Phlyctaenia micacea* Butl.

Aporodes micacea Butl. Ann. Mag. Nat. Hist. (5) VII. 1881, p. 326.
Scopula micacea Meyr. Trans. Ent. Soc. Lond. 1888, p. 220.

♂♀. 18—22 mm. Head, palpi, and thorax dark fuscous, more or less mixed with black and ferruginous, thorax usually with central and posterior white marks, palpi 1½—2. Abdomen blackish mixed with ferruginous, segmental margins white. Legs dark fuscous ringed with white, posterior tibiae whitish above. Forewings dark purplish-slaty-fuscous, towards base and costa somewhat ferruginous-mixed; first line sinuate or nearly straight, vertical, whitish, nearly preceded by a similar line, space between them suffused with reddish-ochreous and whitish except on costa, followed by a thick fascia of blackish suffusion, forming a triangular projection below middle; orbicular round, blackish, upper half usually filled with reddish-ochreous; discal spot 8-shaped, black-outlined, thickened laterally, more or less filled with reddish-ochreous; two small indistinct reddish-ochreous costal spots above this; second line dentate, black, posteriorly partially edged with some white and reddish-ochreous scales, fine and indistinct except towards costa, middle third curved outwards, followed by an elongate reddish-ochreous costal patch including two dark fuscous costal spots, and beneath this edged by a white mark becoming reddish-ochreous posteriorly; a terminal series of minute white dots: cilia dark fuscous, with apical series of whitish dots. Hindwings rather dark fuscous, darker terminally; two obliquely placed darker discal dots; cilia dark fuscous, apical half spotted with whitish.

12 specimens; 9 Kona, Hawaii, from 2000 to 4000 feet; 3 Mts. Waimea, Kauai, at 4000 feet; from May to September. Also recorded from Haleakala, Maui, at 4000 feet, by Mr Blackburn, from whom I received 14 specimens.

(11) *Phlyctaenia eucrena* Meyr.

Scopula eucrena Meyr. Trans. Ent. Soc. Lond. 1888, p. 218.

♂♀. 14—17 mm. Head and thorax reddish-ochreous, sometimes partially or wholly suffused with black, sometimes more or less marked with white. Palpi 2½, reddish-ochreous or blackish above, broadly white beneath. Abdomen pale ochreous mixed with black, segmental margins white. Legs dark fuscous ringed with white, anterior and middle tibiae suffused with reddish-ochreous, posterior tibiae white with two black rings. Forewings brownish-ochreous, slightly reddish-tinged; first and second lines thick, white, first sinuate or nearly straight, vertical, anteriorly partially black-edged or sometimes preceded by a black blotch, posteriorly edged on lower half with some black or grey scales, second irregular, at ¾ abruptly broken inwards to beneath discal spot, anteriorly edged with some black scales; included median space wholly suffused with white, except partial black outline of orbicular, sometimes a costal spot above it, and a costal blotch before second line partially or wholly suffused with black and representing discal spot; in one specimen second line mostly suffused with black except on costa; costa posteriorly spotted with blackish, or sometimes occupied by a blackish suffusion including two white costal dots; a terminal series of black dots: cilia fuscous, mixed or spotted with whitish. Hindwings grey, sometimes suffused with whitish in disc; two obliquely placed darker discal dots; second line waved, whitish, sometimes nearly obsolete; a terminal series of blackish spots; cilia whitish, sometimes mixed with grey, with a darker grey basal line. (Plate V. fig. 26.)

6 specimens; 4 Olaa, Hawaii, at 2000 feet; 1 Kona, Hawaii, at 4000 feet; 1 Kaholuamano, Kauai, at 4000 feet; in April, June, August, and November. The locality of the original specimen received from Mr Blackburn was unrecorded. Those now obtained show a considerable range of variation.

(12) *Phlyctaenia platyleuca*, sp. nov.

♂♀. 22—25 mm. Head, palpi, and thorax brownish-ochreous irrorated with blackish, sometimes partially mixed with whitish. Abdomen ochreous-fuscous or rather dark fuscous, segmental margins in ♂ white. Legs dark fuscous ringed with white, posterior tibiae suffused with whitish. Forewings fuscous or dark fuscous, irrorated with light yellowish; a dark fuscous spot near base, and usually another larger beyond it towards dorsum; first line black, somewhat bent in middle, interrupted above middle, in one ♂ thick, anteriorly white-edged towards dorsum, posteriorly suffused; roundish orbicular and 8-shaped discal spot outlined with black; in one ♂ median band beyond middle wholly suffused with white, in two ♀s only a patch of white suffusion between discal spot and second line, in other ♂s none; second line blackish, posteriorly sometimes more or less whitish-edged, waved, sinuate-curved to rather near termen, at ⅔ rectangularly broken inwards to below discal spot; a spot of dark fuscous suffusion towards costa beyond this; posterior half of costa indistinctly dark-spotted; a terminal series of dark fuscous spots, in one ♂ separated by white dots: cilia dark fuscous, apical half obscurely pale-spotted. Hindwings fuscous, in ♀ darker posteriorly; two obliquely placed darker discal dots; second line faintly darker; a terminal series of dark fuscous dots; cilia as in forewings.

6 specimens; 5 Haleakala, Maui, at 5000 feet, in April and May; 1 Olaa, Hawaii (without white suffusion), at 2000 feet, in November.

(13) *Phlyctaenia metasema*, sp. nov.

♂♀. 15—23 mm. Head, palpi, and thorax brownish-ochreous, more or less irrorated with dark fuscous; palpi 3, base white beneath. Abdomen whitish-ochreous, irrorated with dark fuscous, segmental margins white on middle of back. Legs dark fuscous, ringed with white, posterior tibiae whitish. Forewings light ochreous-fuscous, more ochreous in ♂, more or less irrorated with dark fuscous, sometimes more or less tinged with dull reddish or ferruginous suffusion; first line waved, blackish, angulated in middle, interrupted above middle; roundish orbicular and 8-shaped discal spot dark-outlined; second line blackish, interrupted, sometimes posteriorly whitish-edged towards extremities, sinuate-curved to rather near termen, at $\frac{2}{3}$ abruptly broken inwards to beneath discal spot; a roundish dark fuscous or blackish spot beyond second line beneath costa; posterior half of costa spotted with dark fuscous; sometimes some indistinct dark fuscous terminal spots: cilia fuscous, apical half indistinctly spotted with whitish. Hindwings in ♂ whitish, with dark grey terminal band, sometimes reduced to an apical blotch, in ♀ grey, darker posteriorly; two obliquely placed dark grey discal dots; a postmedian series of dark grey dots, sometimes indistinct; sometimes a terminal series of indistinct dark fuscous dots; cilia whitish, with a grey line. (Plate V. fig. 27.)

17 specimens; 7 Olaa, Hawaii, at 2000 feet; 6 Hilo, Hawaii, at 2000 feet; 4 Haleakala, Maui, at 5000 feet; in January, May, September, November, and December.

(14) *Phlyctaenia ommatias*, sp. nov.

♂. 26 mm. Head, palpi, and thorax dark fuscous mixed with ferruginous, palpi $3\frac{1}{2}$, base whitish-mixed beneath. Abdomen dark fuscous, segmental margins hardly whitish. Legs dark fuscous, tarsi whitish-ochreous, posterior tibiae ferruginous-mixed. Forewings deep purplish-ferruginous, irrorated with dark fuscous; first line dark fuscous, irregular, bent in middle; small round orbicular and crescentic discal spot outlined with dark fuscous, discal mostly filled with white and with lower extremity forming a clear white short longitudinal dash; second line dark fuscous, followed by some whitish scales, sinuate-indented beneath costa, at $\frac{2}{3}$ forming a subquadrate loop inwards beneath discal spot; posterior half of costa spotted with blackish; a terminal series of blackish dots separated by whitish scales: cilia dark fuscous, apical half obscurely pale-mixed. Hindwings dark fuscous; two obliquely placed darker discal dots; a faint darker postmedian line; cilia as in forewings. (Plate V. fig. 28.)

1 specimen, Molokai, at 3000 feet, in June.

(15) *Phlyctaenia caminopis*, sp. nov.

♀. 30 mm. Head, palpi, thorax, and abdomen dark purplish-fuscous, palpi $2\frac{1}{2}$, whitish towards base beneath. Legs dark fuscous, posterior tarsi suffused with pale ochreous. Forewings dark purple-fuscous, towards termen sprinkled with whitish; first line blackish, angulated in middle, thickened dorsally; roundish orbicular and narrow 8-shaped discal spot outlined with ferruginous-blackish; second line ferruginous-blackish, posteriorly indistinctly whitish-edged, sharply indented beneath costa, at $\frac{2}{3}$ forming a subquadrate loop inwards beneath discal spot; an indistinct terminal series of dark fuscous spots: cilia dark fuscous, apical half obscurely whitish-mixed. Hindwings dark purplish-fuscous; cilia as in forewings.

1 specimen, Molokai, at 5000 feet, in September. It is possible that this may be the other sex of the preceding species, but I do not feel justified in uniting them.

(16) *Phlyctaenia pachygramma*, sp. nov.

♀. 27—29 mm. Head, palpi, and thorax dark purplish-fuscous, palpi 2. Abdomen dark fuscous, with dorsal series of white dots. Legs dark fuscous, apex of posterior tibiae whitish. Forewings rather dark purplish-fuscous, costa suffusedly darker; first and second lines very thick, waved, blackish, first somewhat curved, second indented beneath costa, at $\frac{2}{3}$ rather shortly broken inwards; round orbicular touching first line and 8-shaped discal spot strongly outlined with blackish; a terminal series of small blackish spots, separated by pale greyish-ochreous scales: cilia dark fuscous, tips whitish-mixed. Hindwings rather dark fuscous; two obliquely placed darker discal dots; a cloudy darker postmedian line; a terminal series of darker spots; cilia as in forewings. (Plate V. fig. 29.)

2 specimens; 1 Olaa, Hawaii, in September; 1 Waianae Mts., Oahu, at 2000 feet, in February.

(17) *Phlyctaenia ennychioides* Butl.

Mecyna ennychioides Butl. Ann. Mag. Nat. Hist. (5) VII. 1881, p. 328.
Melanomecyna ennychioides id. Ent. Mo. Mag. XIX. p. 179; *M. stellata* ib. p. 179.
Scopula ennychioides Meyr. Trans. Ent. Soc. Lond. 1888, p. 221; *S. stellata* ib. p. 222.

♂♀. 19—24 mm. Head, palpi, and thorax dark fuscous, palpi 2½—3. Abdomen fuscous, segmental margins whitish. Legs dark fuscous, ringed with whitish, posterior tibiae suffused with whitish. Forewings rather dark purplish-fuscous, costa and base sometimes darker-suffused; first line dark fuscous, bent in middle, sometimes interrupted above middle; roundish orbicular and 8-shaped discal spot outlined or sometimes wholly suffused with dark fuscous, sometimes obscurely pale-centred; second line waved, dark fuscous, posteriorly partially whitish-edged, especially towards dorsum, indented near costa, at $\frac{2}{3}$ abruptly broken inwards to beneath discal spot; posterior half of costa often obscurely spotted with dark fuscous and pale; a terminal series of dark fuscous spots, sometimes separated by ochreous-whitish scales: cilia dark fuscous, apical half more or less mixed with ochreous-whitish. Hindwings fuscous or rather dark fuscous; two indistinct obliquely placed darker discal dots; a faint darker postmedian line; a terminal series of dark spots; cilia as in forewings, but more whitish.

22 specimens; 5 Olaa, Hawaii, at 2000 feet; 1 Hilo, Hawaii, at 2000 feet; 1 Kilauea, Hawaii; 1 Kona, Hawaii, at 1500 feet; 3 Haleakala, Maui, at 5000 feet; 2 Waianae Mts., Oahu, at 3000 feet; 4 Molokai, at 4000 feet; 1 Lanai, at 2000 feet; 4 Kaholuamano, Kauai, at 4000 feet; in January, and from April to December. Also seven specimens received from Mr Blackburn; the additional material now obtained shows that only one species is indicated under the names quoted. My reference to *Scotomera tristis* (l. c. p. 222) must have been made under some misapprehension, as it is an Indian species.

(18) *Phlyctaenia argoscelis* Meyr.

Scopula argoscelis Meyr. Trans. Ent. Soc. Lond. 1888, p. 222.

♂♀. 20—25 mm. Head, palpi, and thorax rather dark purplish-fuscous, sometimes partly ferruginous-tinged, palpi 3½—4, whitish towards base beneath. Abdomen rather dark fuscous, segmental margins white on back. Legs dark fuscous, ringed with whitish, anterior and middle tibiae and tarsi wholly suffused with white. Forewings rather dark purple-fuscous, sometimes partially tinged with ferruginous suffusion; first line dark fuscous, bent in middle, interrupted above middle; small roundish orbicular and 8-shaped discal spot suffused with dark fuscous; second line waved, dark fuscous, sinuate-curved, at ⅔ abruptly broken inwards to below discal spot; posterior half of costa sometimes pale, more or less distinctly spotted with dark fuscous; a terminal series of dark fuscous spots: cilia dark fuscous. Hindwings rather dark fuscous, slightly coppery-tinged; sometimes two obliquely placed discal dots and postmedian line darker; a terminal series of darker spots; cilia whitish-fuscous, with two cloudy darker lines.

24 specimens; 3 Kona, Hawaii, at 4000 feet; 1 Olaa, Hawaii, at 2000 feet; 4 Waianae Mts., Oahu, at 3000 feet; 1 Molokai, at 4000 feet; 9 Mts. Waimea, Kauai, at 4000 feet; 6 Kaholuamano, Kauai, at 4000 feet; from April to November. Also three specimens received from Mr Blackburn.

(19) *Phlyctaenia despecta* Butl.

Rhodaria despecta Butl. Ent. Mo. Mag. XIV. p. 49.
Scopula exigua ib. XVII. p. 9.
Scopula despecta Meyr. Trans. Ent. Soc. Lond. 1888, p. 223.

♂♀. 15—27 mm. Head, palpi, and thorax ferruginous, sometimes infuscated, palpi 3—3½, white towards base beneath, thorax sometimes suffused with ochreous-yellowish posteriorly. Abdomen grey, sometimes suffused with ochreous-yellowish or ferruginous. Legs whitish, sometimes more or less variably suffused with ferruginous. Forewings reddish-ochreous or fuscous-ochreous or ferruginous, sometimes much mixed with dark fuscous, especially towards costa on anterior half, sometimes much tinged with coppery-purplish; first line dark fuscous, bent in middle but usually obsolete on costal half; roundish orbicular and 8-shaped discal spot outlined with dark fuscous; second line waved or denticulate, dark fuscous, more or less curved on upper portion, sometimes sinuate near costa, below middle with an abrupt semicircular excavation inwards beneath discal spot; posterior half of costa sometimes spotted with dark fuscous; a terminal series of dark fuscous or blackish dots; cilia rather dark fuscous, tips obscurely whitish. Hindwings fuscous, darker posteriorly, sometimes mixed with lighter ochreous suffusion; two obliquely placed dark fuscous discal dots; usually an indistinct darker postmedian line as in forewings; a terminal series of blackish dots; cilia grey or grey-whitish, with dark grey subbasal line.

55 specimens; 18 Kona, Hawaii, at 3500—4000 feet; 3 Olaa, Hawaii, at 2000 feet; 1 Hilo, Hawaii, at 2000 feet; 7 Waianae Mts., Oahu, at 2000—3000 feet; 1 Lanai, at 2000 feet; 2 Molokai, at 3000 feet; 9 Mts. Waimea, Kauai, at 4000 feet; 14 Kaholuamano, Kauai, at 4000 feet; occurs all the year round. Also recorded from Maui by Mr Blackburn, from whom I received 24 specimens; he has described the larva, Ent. Mo. Mag. xix. 56. This species varies locally, especially in size, and I found it hard to believe that the extreme forms could be identical, but after prolonged examination I can find no reliable distinctions. The small rather dull form originally described is the Oahu form; the Kona specimens are all medium-sized, lighter-coloured; the largest and darkest specimens (mostly purple-tinged) are from Kauai (especially Mts. Waimea), but transitional specimens from the same localities also occur. The single Hilo specimen is very purple-tinged, indistinctly marked. Probably these differences are directly attributable to climatic influences.

(20) *Phlyctaenia liopis*, sp. nov.

♂♀. 20—22 mm. Head, palpi, and thorax light fuscous-reddish, palpi $2\frac{1}{2}$—3. Abdomen pale whitish-ochreous. Legs whitish, more or less suffused with dull ochreous-reddish. Forewings elongate, pale ochreous, suffusedly irrorated with light fuscous and reddish; first line dark fuscous, irregular, sometimes obsolete on costal half or wholly; roundish orbicular and 8-shaped discal spot fuscous, in ♀ ill-defined; second line dark fuscous, waved, sometimes indistinct, upper portion unevenly curved, below middle with an abrupt semicircular excavation inwards beneath discal spot; a series of dark fuscous dots along termen and apical third of costa: cilia fuscous-whitish with obscure reddish-fuscous line. Hindwings whitish, faintly ochreous-tinged, in ♂ suffused with light reddish and fuscous towards apex; two obliquely placed dark fuscous discal dots; in ♂ a dark fuscous postmedian line; a terminal series of dark fuscous dots, sometimes indistinct; cilia whitish, faintly reddish-tinged. (Plate V. fig. 30.)

3 specimens, Haleakala, Maui, at 5000—6000 feet, in April and May.

(21) *Phlyctaenia endopyra*, sp. nov.

♂♀. 15—21 mm. Head, palpi, and thorax ferruginous-orange, more or less mixed with dark fuscous, palpi 2½—3, whitish towards base beneath. Abdomen greyish-ochreous mixed with dark fuscous, segmental margins whitish. Legs ochreous-whitish or brownish-ochreous, more or less suffused with dark fuscous, posterior tibiae more whitish. Forewings elongate, ferruginous-orange or deep ferruginous, sometimes suffusedly irrorated with dark fuscous except towards costa, where it is sometimes brighter orange; first line dark fuscous, rectangularly bent in middle, sometimes obsolete on upper half; roundish orbicular and 8-shaped discal spot more or less suffused with dark fuscous, in ♂ closely approximated and separated only by a vertical yellow linear mark (seldom obsolete), in ♀ separated by a clear orange quadrate spot, orbicular preceded by a smaller similar spot; posterior half of costa sometimes spotted with dark fuscous; second line dark fuscous, upper portion parallel to termen, slightly sinuate near costa, below middle abruptly broken inwards to beneath discal spot; a terminal series of dark fuscous dots: cilia fuscous, tips obscurely whitish. Hindwings in ♂ whitish-ochreous, grey-sprinkled, in ♀ light fuscous, slightly yellowish-tinged; two obliquely placed darker discal dots; a curved darker grey postmedian line; in ♂ sometimes a terminal fascia of grey suffusion; a terminal series of dark fuscous dots; cilia fuscous-whitish, with fuscous subbasal line.

6 specimens; 4 Haleakala, Maui, at 5000 feet, from March to May; 2 Hilo, Hawaii, at 2000 feet, in January. Distinguished from its allies by form of second line.

(22) *Phlyctaenia rhodias*, sp. nov.

♂♀. 19—24 mm. Head, palpi, and thorax ferruginous or dark reddish, partially sprinkled with dark grey, palpi 2½—3, white towards base beneath. Abdomen whitish-ochreous. Legs light yellow-ochreous, more or less suffused with reddish. Forewings elongate, rosy-ochreous, irrorated with dull crimson; lines dark grey, ill-defined, first obtusely angulated in middle, second waved, unevenly curved on upper portion, below middle abruptly broken inwards beneath discal spot; roundish orbicular and 8-shaped discal spot indistinctly outlined or suffused with dark grey; a terminal series of blackish dots: cilia dull purplish, mixed with dark grey. Hindwings dull ochreous-whitish, sometimes posteriorly rosy-tinged; two obliquely placed grey discal dots; an indistinct curved grey postmedian line; a terminal series of blackish dots; cilia whitish or rosy-whitish.

3 specimens; 2 Molokai, at 4500 feet, in September; 1 Lanai, at 3000 feet, in July.

(23) *Phlyctaenia pyranthes*, sp. nov.

♂♀. 19—23 mm. Head and thorax ferruginous-orange, patagia reddish. Palpi $3\frac{1}{2}$—4, ochreous-reddish, base white beneath. Abdomen whitish-ochreous, reddish-tinged. Legs dark reddish, banded with white, middle pair almost wholly white. Forewings yellow-ochreous, almost wholly suffused with purple-reddish; lines obscurely darker or almost obsolete, sometimes mixed or partly dotted with dark fuscous, first bent in middle, second sometimes posteriorly pale-edged, curved on upper portion, sinuate-indented near costa, below middle abruptly broken inwards to beneath discal spot; roundish orbicular and 8-shaped discal spot darker purple-reddish, sometimes fuscous-tinged; sometimes a terminal series of blackish dots: cilia dull purple or purplish-grey, tips whitish. Hindwings pale whitish-ochreous, more or less rosy-tinged, especially posteriorly; two obliquely placed sometimes indistinct dark grey discal dots; sometimes an obscure grey postmedian line; sometimes a terminal series of dark fuscous dots; cilia rosy-whitish. (Plate V. fig. 31.)

6 specimens; 2 Hilo, Hawaii, at 2000 feet, in January; 3 Mts. Waimea, Kauai, at 4000 feet, in May and June; 1 Kaholuamano, Kauai, at 4000 feet, in April.

(24) *Phlyctaenia heterodoxa*, sp. nov.

♂♀. 17—21 mm. Head, palpi, and thorax brownish-ochreous, palpi $2\frac{1}{2}$, white towards base beneath. Abdomen greyish-ochreous. Legs fuscous, posterior pair whitish-fuscous. Forewings pale ochreous irrorated with fuscous, sometimes ferruginous-tinged, especially towards base of costa and on terminal area, sometimes whitish-suffused in disc; orbicular and discal spots dot-like, rather dark fuscous, sometimes obsolete; second line straight or faintly sinuate, parallel to termen, in ♂ whitish, edged posteriorly with fuscous or dark fuscous suffusion, in ♀ obscurely paler, edged posteriorly by ferruginous terminal area: cilia pale ochreous or ochreous-whitish. Hindwings in ♂ whitish, in ♀ grey; two indistinct grey obliquely placed discal dots; an apical patch of rather dark grey suffusion, margined anteriorly by traces of a postmedian line; cilia in ♂ whitish, in ♀ grey, ferruginous-tinged. (Plate V. fig. 32.)

4 specimens, Haleakala, Maui, at 5000 feet, from March to May.

PYRAUSTA *Schranck.*

I have suppressed the genus *Protocolletis* Meyr., having shown elsewhere that the character on which it was founded, the anastomosing of vein 10 of the forewings with 9 towards base, occurs occasionally as an exceptional structure in several species of this and allied genera; yet as it appears to be constant in Hawaiian forms, I have here ranked the two species which exhibit the structure as a separate section.

1. Forewings mixed with green .... (*1*) *bryochloris*.
    „ not green .... 2.
2. Forewings with dorsal edge black on median area .... (*8*) *psychropa*.
    „ „ not black .... 3.
3. Orbicular confluent beneath with dark blotch reaching dorsum .... (*2*) *dracontias*.
    „ not confluent with dark blotch beneath .... 4.
4. Forewings dark purplish-fuscous .... (*6*) *brontias*.
    „ not dark fuscous .... 5.
5. Forewings more or less ferruginous .... 6.
    „ whitish-ochreous .... 8.
6. Hindwings yellowish .... (*10*) *phaethontia*.
    „ light fuscous .... 7.
7. Palpi 2½—3 .... (*5*) *thermantis*.
    „ 5 .... (*9*) *constricta*.
8. Orbicular and discal spots obsolete .... (*7*) *litorea*.
    „ „ distinct .... 9.
9. Head and thorax hardly dark-sprinkled .... (*3*) *dryadopa*.
    „ „ densely irrorated with dark fuscous .... (*4*) *chloropis*.

(1) *Pyrausta bryochloris*, sp. nov.

♂♀. 28—32 mm. Head, palpi, and thorax black mixed with green, palpi 2. Abdomen rather dark fuscous. Legs dark fuscous, ringed with whitish. Forewings blackish, densely irregularly irrorated with light green; two white basal dots; a well-marked black subbasal line, followed by whitish-green suffusion; first and second lines slender, white, waved, internally black-edged, first irregular, second moderately curved outwards between $\frac{1}{5}$ and $\frac{3}{5}$; dorsal scale-tuft white mixed with fuscous; roundish orbicular and 8-shaped discal spot outlined with ferruginous, discal marked with two white dots; some light purplish suffusion in disc below these; blotches of dark ground-colour at apex and tornus; a terminal series of white dots: cilia fuscous, mixed with darker and pale. Hindwings dark fuscous, rather lighter anteriorly; cilia as in forewings. (Plate VI. fig. 1.)

2 specimens, Haleakala, Maui, at 5000 feet, in March.

(2) *Pyrausta dracontias*, sp. nov.

♀. 26—27 mm. Head, palpi, and thorax dark fuscous mixed with whitish, palpi 3½. Abdomen fuscous, sprinkled with darker and whitish. Legs dark fuscous, sprinkled with whitish. Forewings rather dark fuscous; first line double, purple-whitish, nearly straight; orbicular trapezoidal, dark fuscous, indistinctly whitish-edged except on lower margin, where it is confluent with a dark fuscous blotch occupying anterior half of median band and extending to dorsum; discal spot irregularly pentagonal, blackish-fuscous, white-edged; second line slender, white, anteriorly dark-edged, preceded by a broad band of whitish suffusion, middle third strongly curved outwards: cilia fuscous, mixed with dark fuscous and whitish. Hindwings fuscous; a darker discal dot; an indistinct darker postmedian line; cilia whitish, spotted with fuscous, with a dark fuscous subbasal line. (Plate VI. fig. 2.)

2 specimens; 1 Mts. Waimea, Kauai, at 4000 feet; 1 Kaholuamano, Kauai, at 4000 feet; in April and May.

(3) *Pyrausta dryadopa*, sp. nov.

♂♀. 21—22 mm. Head, palpi, and thorax pale whitish-ochreous, shoulders with a few dark fuscous specks, palpi 3½, thinly sprinkled with dark fuscous. Abdomen whitish-ochreous, sprinkled with fuscous and dark fuscous, segmental margins whitish. Legs whitish, banded with dark fuscous irroration, posterior tibiae wholly whitish. Forewings in ♂ with termen strongly sinuate below apex; pale whitish-ochreous, sprinkled with brownish or dark fuscous; first line pale, edged posteriorly with dark fuscous on lower half, obtusely angulated outwards in middle, and more sharply inwards near dorsum; roundish orbicular and 8-shaped discal spot outlined with brownish or dark fuscous, space between them pale, discal dark-centred; a dark fuscous costal dot above discal spot; second line pale, waved, edged anteriorly with dark fuscous, upper ⅔ moderately curved outwards, thence rectangularly broken inwards to beneath discal spot; costal area beyond this wholly pale except two dark fuscous dots; terminal area in ♀ suffused with dark fuscous from beneath apex to below middle; a terminal series of dark fuscous dots: cilia whitish-ochreous with two dark fuscous lines, and barred with dark fuscous. Hindwings fuscous-whitish, in ♀ irrorated with fuscous; two obliquely placed dark fuscous discal dots; a waved, darker fuscous postmedian line; a darker subterminal shade, leaving a whitish terminal line, marked with a series of black dots; cilia whitish, with two indistinct interrupted fuscous lines.

3 specimens; 1 Mts. Waimea, Kauai, at 4000 feet; 1 Kaholuamano, Kauai, at 4000 feet; 1 Haleakala, Maui, at 5000 feet; in April and May.

(4) *Pyrausta chloropis*, sp. nov.

♂♀. 20—25 mm. Head, palpi, thorax, and abdomen whitish-ochreous, more or less brownish-tinged and irrorated with dark fuscous, palpi 3½—4, whitish beneath. Legs ochreous-whitish, indistinctly banded with dark fuscous. Forewings whitish-ochreous, irrorated with dark brown; a dark fuscous suffusion on base of costa; first and second lines dark fuscous, waved, first bent in middle, posteriorly pale-edged, second curved, indented below costa, below middle rectangularly broken inwards to beneath discal spot; included median band rather darker-suffused except on costa; roundish orbicular and reniform discal spot darker, separated by a pale or ochreous-white spot; posterior half of costa dotted with dark fuscous; a terminal series of dark fuscous marks: cilia ochreous-whitish, barred with fuscous, with two dark fuscous lines. Hindwings rather light fuscous; two obliquely placed dark fuscous discal dots; a waved dark fuscous postmedian line, with middle third curved outwards; terminal marks and cilia as in forewings.

16 specimens; 3 Olaa, Hawaii, at 2000 feet, in November; 1 Hilo, Hawaii, at 2000 feet, in January; 9 Kaholuamano, Kauai, at 4000 feet, in April; 3 Mts. Waimea, Kauai, at 4000 feet, in May and June.

(5) *Pyrausta thermantis*, sp. nov.

♂♀. 19—21 mm. Head, palpi, and thorax ferruginous, mixed with black and pale ochreous, palpi 2½—3. Abdomen fuscous, irrorated with whitish-ochreous. Legs ferruginous, partly suffused with black. Forewings ferruginous, irrorated with dark fuscous; first and second lines obscurely ochreous-whitish, edged internally with dark fuscous, first somewhat angulated above middle, obsolete towards costa, second curved, slightly waved, indented beneath costa, below middle sending an abrupt narrow loop inwards to beneath discal spot; roundish orbicular and reniform discal spot outlined with dark fuscous, separated by a quadrate spot of whitish suffusion, discal spot followed by some whitish suffusion; costa posteriorly spotted with dark and pale; a spot of dark fuscous suffusion beyond second line beneath costa; a terminal series of obscure dark fuscous dots: cilia grey, paler-mixed, with darker subbasal line. Hindwings light fuscous; two obliquely placed dark grey discal dots; a curved dark grey postmedian line, obscurely pale-edged posteriorly; a terminal series of dark fuscous dots; cilia grey-whitish, with two grey lines. (Plate VI. fig. 3.)

3 specimens, Olaa, Hawaii, in June.

(6) *Pyrausta brontias*, sp. nov.

♂♀. 21—25 mm. Head, palpi, and thorax dark fuscous, crown often mixed with ferruginous-ochreous, palpi 3—3½. Abdomen rather dark fuscous, segmental margins whitish, anal tuft pale ochreous. Legs dark fuscous, ringed with ochreous-whitish. Forewings glossy dark purplish-fuscous; often a ferruginous-ochreous dorsal suffusion before first line; first and second lines blackish-fuscous, first hardly traceable, second often more or less edged posteriorly with ochreous-whitish, curved, indented beneath costa, below middle forming an abrupt loop inwards beneath discal spot; roundish orbicular and 8-shaped discal spot darker, sometimes very indistinct; a terminal series of ochreous-whitish marks: cilia dark fuscous. Hindwings fuscous, becoming darker posteriorly; two indistinct darker obliquely placed discal dots; a terminal series of whitish dots; cilia fuscous, tips whitish.

10 specimens; 8 Kaholuamano, Kauai, at 4000 feet; 2 Mts. Waimea, Kauai, at 4000 feet; from April to June.

(7) *Pyrausta litorea* Butl.

Scopula litorea Butl. Ent. Mo. Mag. XIX. p. 178.
Eurycreon litorea Meyr. Trans. Ent. Soc. Lond. 1888, p. 230.

No additional specimens obtained. Recorded by Mr Blackburn from Mauna Lea, Lanai, in September. After careful comparison with allied forms, I consider that the face is only somewhat prominently rounded and has no true frontal projection. The first and second lines of forewings are sometimes more distinctly indicated by dots of blackish scales than is implied in my description, but none of the specimens are good.

(8) *Pyrausta psychropa*, sp. nov.

♂. 23—28 mm. Head, palpi, and thorax whitish mixed with fuscous or whitish-fuscous, palpi 3, with broad lateral blackish-fuscous stripe, base white beneath, edge of shoulder black. Abdomen rather elongate, fuscous, whitish-mixed, anal tuft whitish. Legs fuscous mixed with whitish. Forewings fuscous, thickly suffusedly strewn with white scales, and more or less irrorated with dark fuscous; a short black longitudinal streak from base of costa; first line darker, only distinct near costa, where it is very oblique and somewhat marked with black; dorsal edge sharply black between first and second lines; oval orbicular and narrow-reniform discal spot outlined with dark fuscous or blackish, oblique; second line hardly perceptible except towards costa, where it forms a very oblique blackish streak, followed by a small white costal spot, elsewhere sometimes partially indicated by dark fuscous dots, apparently sending an abrupt loop inwards beneath discal spot; a terminal series of black dots: cilia whitish, with a fuscous subbasal line. Hindwings fuscous, lighter anteriorly; two obliquely placed darker discal dots; sometimes obscure indications of a postmedian line. (Plate VI. fig. 4.)

3 specimens; 2 Kaholuamano, Kauai, at 4000 feet; 1 Mts. Waimea, Kauai, at 4000 feet; in April and May.

Section PROTOCOLLETIS Meyr.

(9) *Pyrausta constricta* Butl.

Scopula constricta Butl. Trans. Ent. Soc. Lond. 1882, p. 40.

Protocolletis constricta Meyr. Trans. Ent. Soc. Lond. 1888, p. 224.

No examples of this species were included in the collection. The original specimens were bred from larvae feeding between spun leaves of an unidentified plant on the mountains near Honolulu, Oahu.

(10) *Pyrausta phaethontia*, sp. nov.

♂. 33—37 mm. Head, palpi, and thorax ochreous-ferruginous, palpi 4, crimson-tinged, sprinkled with dark fuscous. Abdomen ochreous-yellowish, sprinkled with crimson-ferruginous. Legs ochreous-yellowish, more or less suffused with crimson-ferruginous. Forewings ochreous-yellowish, densely irrorated or wholly suffused with crimson-ferruginous; small orbicular and transverse discal spot infuscated but very obscure and undefined; second line darker, hardly traceable, rather curved on upper portion, sinuate beneath costa, apparently forming a loop inwards beneath discal spot: cilia ferruginous-purplish, somewhat whitish-mixed. Hindwings light ochreous-yellowish; two obliquely placed rosy-grey discal dots; a faint rosy-grey waved line beyond $\frac{3}{4}$; apex more or less rosy-suffused; cilia purple, tips paler. (Plate VI. fig. 5.)

5 specimens; 4 Olaa, Hawaii; 1 Kona, Hawaii, at 4000 feet; in June, September, and December.

MECYNA *Steph.*

(1) *Mecyna aurora* Butl.

Anemosa aurora Butl. Ann. Mag. Nat. Hist. (5) VII. 1881, p. 327.
Mecyna aurora Meyr. Trans. Ent. Soc. Lond. 1888, p. 225.
(Plate VI. fig. 6.)

A single specimen, without locality; it is a female (this sex being previously unknown), expanding 18 mm., but not differing in any way from the male. By an unfortunate perversity the locality of Mr Blackburn's specimens has also escaped record.

(2) *Mecyna virescens* Butl.

Mecyna virescens Butl. Ann. Mag. Nat. Hist. (5) VII. 1881, p. 329; Meyr. Trans. Ent. Soc. Lond. 1888, p. 225.

41 specimens; 28 Kona, Hawaii, at 4000 feet; 2 Haleakala, Maui, at 5000 feet; 7 Waianae Mts., Oahu, at 2000 feet; 2 Halemanu, Kauai; 2 Mts. Waimea, Kauai, at 4000 feet; from March to September. Bred by Mr Blackburn from larvae feeding on an *Acacia* (?), on Haleakala; 14 specimens sent by him.

LOXOSTEGE *Hüb.*

1. Forewings reddish-brown ....*(1) conisalias.*
„ orange or ochreous ....2.
2. First and second lines well-marked ....*(3) helioxantha.*
„ „ absent ....*(2) melanopis.*

(1) *Loxostege conisalias*, sp. nov.

♂. 19—23 mm. Head, thorax, and abdomen greyish-ochreous, more or less ferruginous-tinged. Antennal ciliations ¼ (longer at base). Palpi 4½, ferruginous, sprinkled with dark fuscous. Forewings with termen rather sinuate beneath apex; reddish-brown, sprinkled with dark fuscous; median band more or less suffused with dark fuscous, anterior edge very ill-defined, posterior moderately curved to below middle, thence rectangularly broken inwards to below discal spot; discal spot small, white, surrounded by darker suffusion: cilia pale fuscous, with two dark fuscous lines. Hindwings light fuscous; cilia whitish-fuscous, with fuscous subbasal line.

3 specimens, Hilo, Hawaii, at 2000 feet, in December and January.

(2) *Loxostege melanopis*, sp. nov.

♂. 21 mm. Head, palpi, thorax, and abdomen reddish-ochreous, palpi 4½, sprinkled with black, abdomen ferruginous-suffused. Antennal ciliations 1. Forewings with termen faintly sinuate beneath apex; orange-ochreous, suffusedly sprinkled with ferruginous; costal edge blackish except towards apex; round orbicular and 8-shaped discal spot blackish: cilia apparently ochreous with blackish lines (imperfect). Hindwings pale yellowish-ochreous, suffusedly irrorated with grey except on a terminal band; two indistinct obliquely placed darker discal dots; cilia ochreous-whitish. (Plate VI. fig. 7.)

1 specimen, Olaa, Hawaii, at 2000 feet, in November.

(3) *Loxostege helioxantha*, sp. nov.

♀. 32—34 mm. Head and thorax light orange, shoulders reddish-brown. Palpi 6, ochreous, more or less suffusedly irrorated with reddish and sprinkled with dark fuscous. Abdomen light yellow-ochreous. Forewings with termen not sinuate; vein 10 sometimes stalked with 9; light orange, veins more or less marked with grey-reddish suffusion; costal edge dark fuscous on anterior half; first and second lines grey-reddish, first angulated in middle, second slightly waved, curved, indented beneath costa, below middle forming a deep abrupt loop inwards beneath discal spot ; round orbicular and reniform discal spot reddish-brown : cilia grey-reddish. Hindwings light yellowish ; two obliquely placed rosy-grey discal spots ; a faint rosy-grey postmedian line ; cilia whitish-rosy. (Plate VI. fig. 8.)

4 specimens, Kaholuamano, Kauai, at 4000 feet, in April. The variation in the structure of vein 10 of forewings is curious but does not impair the generic definition, though enlarging it ; it appears to be normal in this species, for the four individuals all differ in this respect, varying from complete separation through partial fusion to stalking for fully half their length.

NOMOPHILA *Hüb.*

(1) *Nomophila noctuella* Schiff.

10 specimens ; 1 Olaa, Hawaii ; 1 Haleakala, Maui, at 5000 feet ; 6 Waianae Mts., Oahu, at 1300 feet ; 2 Mts. Waimea, Kauai, at 4000 feet ; from April to June, and in September. Almost a cosmopolitan species.

HELLULA *Guen.*

(1) *Hellula undalis* Fab.

2 specimens ; 1 Honolulu Mts., Oahu ; 1 Mts. Waimea, Kauai, at 4000 feet ; in June.

PROMYLAEA, gen. nov.

Face rounded, vertical ; ocelli present ; tongue developed. Antennae $\frac{3}{4}$, in ♂ — ? Labial palpi rather short, porrected, with appressed scales, terminal joint short, pointed. Maxillary palpi extremely short, resting on base of labial. Posterior tibiae with outer spurs $\frac{3}{4}$. Forewings normal. Hindwings with vein 3 absent, 4 and 5 closely approximated at base, 7 remote from 6 at origin, anastomosing with 8 to near middle, lower median without pecten.

This genus is closely allied to *Mestolobes*, but differs in the extremely small (hardly visible) maxillary palpi, and the separation of veins 4 and 5 of hindwings ; the ♂ may probably show differences in respect of the secondary sexual characters of hindwings.

(1) *Promylaea pyropa*, sp. nov.

♀. 18 mm. Head and thorax deep shining bluish-leaden, back of crown orange. Palpi orange. Abdomen dark fuscous. Legs prismatic-fuscous, middle and posterior femora pale coppery-golden. Forewings fuscous-blackish; a patch occupying basal fourth, produced on costa, a very broad fascia of irroration beyond middle, becoming uniform on costal half anteriorly, and a rather narrow terminal fascia shining bluish-leaden: cilia fuscous, basal $\frac{2}{5}$ blackish-fuscous. Hindwings dark fuscous, with coppery reflections, somewhat lighter towards base; cilia as in forewings. (Plate VI. fig. 9.)

1 specimen, Molokai, at 4000 feet.

MESTOLOBES *Butl.*

The characters given may be augmented as follows: hindwings with veins 3 and 4 connate or stalked, 7 frequently separate from 6, anastomosing more or less with 8; in ♂ sometimes with subdorsal groove as in *Orthomecyna*, dorsal lobe sometimes modified into a pocket beneath, with or without costal hair-pencil or ridge of curled hairs.

1. Forewings with groundcolour uniform blackish or dark fuscous ....2.
,, ,, not uniform dark fuscous ....10.
2. Forewings with several violet-blue-metallic spots in disc ....(*1*) *amethystias.*
,, without such spots ....3.
3. Forewings wholly without markings ....(*7*) *sirina.*
,, with more or less marking ....4.
4. Forewings with white antemedian dorsal spot ....(*8*) *epidelta.*
,, without such spot ....5.
5. Forewings with four shining leaden fasciae ....(*2*) *chrysomolybda.*
,, without such fasciae ....6.
6. Palpi wholly whitish ....(*4*) *crypsichrysa.*
,, not whitish ....7.
7. Forewings with termen concave beneath apex ....(*5*) *erinnys.*
,, ,, not concave ....8.
8. Forewings with lines orange or ferruginous-mixed ....9.
,, ,, not orange or ferruginous ....(*6*) *arctura.*
9. Forewings with discal spot indicated ....(*11*) *ombrias.*
,, ,, obsolete ....(*3*) *xanthoscia.*
10. Hindwings whitish or yellowish, at least in disc ....11.
,, not whitish or yellowish in disc ....21.
11. Forewings with basal third almost wholly whitish ....12.
,, ,, not wholly whitish ....13.
12. Hindwings with terminal dark fascia entire ....(*22*) *chlorolychna.*
,, ,, not reaching below middle ....(*24*) *semiochrea.*
13. Hindwings with entire dark terminal band with median projection inwards ....14.
,, without band so formed ....15.
14. Hindwings with costal hair-pencil ....(*18*) *pessias* ♂.
,, without costal hair-pencil ....(*21*) *mesacma* ♂.
15. Palpi fuscous ....16.
,, mostly ochreous-whitish or yellowish ....18.
16. Posterior tibiae with black projecting scales ....(*15*) *scleropis* ♂.
,, without black scales ....17.

17. Tuft of dorsal lobe blackish-tipped ....(*20*) *aphrias* ♂.
,, ,, not blackish-tipped..(*27*) *autodoxa*.
18. First line with wedge-shaped projection inwards in middle ....(*25*) *pragmatica*.
,, without such projection ....19.
19. Forewings ochreous-orange ....(*23*) *perixantha*.
,, not orange ....20.
20. First line slender, not suffused ....(*26*) *abnormis*.
,, broad, suffused on one side ....(*17*) *orthrias*.
21. Head and thorax yellow-ochreous ....(*14*) *ochrias*.
,, ,, not yellow-ochreous ....22.
22. Forewings with basal area ferruginous-ochreous except on costa ....(*9*) *iochrysa*.
,, with basal area not ferruginous-ochreous ....23.
23. First line forming a broad whitish fascia ....(*16*) *eurylyca*.
,, not broadly whitish ....24.
24. Expanse 13 mm. or less ....(*13*) *minuscula*.
,, 14 mm. or more..25.
25. Expanse 16 mm. or more..26.
,, 15 mm. or less ....(*12*) *banausa*.
26. Forewings without definite markings ....(*28*) *homalopa*.
,, with distinct lines ....27.
27. First line straight ....(*10*) *droseropa*.
,, curved or angulated..28.
28. Hindwings fuscous-grey ....(*19*) *chimonias*.
,, dark fuscous ....29.
29. Forewings with first line distinctly angulated ....30.
,, ,, rather curved (Molokai species)..................(*15*) *scleropis* ♀.
30. First line angulated in middle (Kauai species) ....(*20*) *aphrias* ♀.
,, ,, above middle (Maui species) ....(*18*) *pessias* ♀.

In the preceding tabulation characters are selected which are independent of sex, so far as possible, since in some species only one sex is known; but the males of allied species are sometimes most easily separated by the very well-marked differences in the secondary sexual characters, viz. the tufts of hair on the hindwings and legs.

(1) *Mestolobes amethystias*, sp. nov.

♀. 13 mm. Head and thorax dark fuscous, face with lateral whitish line. (Palpi broken.) Abdomen dark fuscous, segmental margins white. Legs dark fuscous, ringed with whitish. Forewings blackish; subbasal, first, second, and subterminal lines fulvous-orange, subbasal and first forming sinuate fasciae, separated by a violet-silvery-metallic line, second and subterminal thick, strongly curved, also separated by a violet-silvery-metallic line; several small scattered pale violet-blue-metallic spots in disc; a whitish wedge-shaped mark on costa before apex: cilia fuscous, with two dark fuscous lines. Hindwings dark fuscous, lighter anteriorly; cilia whitish, with dark fuscous basal line. (Plate VI. fig. 10.)

1 specimen, Kaholuamano, Kauai, at 4000 feet, in April.

(2) *Mestolobes chrysomolybda*, sp. nov.

♂♀. 14—15 mm. Head, thorax, and abdomen dark leaden-fuscous. Palpi blackish, beneath pale yellowish. Legs dark grey, ringed with whitish. Forewings blackish-fuscous; subbasal, first, second, and subterminal lines thick, fulvous-orange, each preceded by a shining deep leaden fascia; subbasal and first angulate-sinuate, sometimes almost obsolete, preceding fasciae broad; second sinuate-angulated in middle, preceding fascia broad; subterminal close to termen, curved, preceding fascia narrow, remote from second: cilia dark fuscous, with blackish subbasal line. Hindwings dark grey, with broad blackish-grey terminal band; a more or less marked longitudinal streak of whitish suffusion in disc; in ♂ with short dorsal lobe ending in tuft of white hairs, and whitish costal hair-pencil; cilia white, with dark grey basal line. (Plate VI. fig. 11.)

3 specimens, Kaholuamano, Kauai, at 4000 feet, in April.

(3) *Mestolobes xanthoscia*, sp. nov.

♀. 12—15 mm. Head, thorax, abdomen, and legs dark fuscous. Palpi fuscous, sometimes yellowish except towards apex. Forewings dark fuscous, slightly purple-tinged; first and second lines fulvous-orange, usually darker-edged, first about middle, curved or somewhat bent, sometimes nearly obsolete except towards costa, second rather near termen, curved: cilia rather dark fuscous, with darker subbasal line. Hindwings rather dark fuscous, darker posteriorly; cilia as in forewings.

5 specimens; 3 Kilauea, Hawaii, in August; 1 Olaa, Hawaii, at 2000 feet, in November; 1 Waianae Mts., Oahu, in April.

(4) *Mestolobes crypsichrysa*, sp. nov.

♂♀. 14—15 mm. Head, thorax, abdomen, and legs dark fuscous. Palpi whitish. Forewings blackish-fuscous; subbasal, first, and second lines more or less indicated by fulvous-orange irroration, very undefined, first and second sometimes forming distinct spots on costa, first about middle, angulated above middle, second at $\frac{3}{4}$, angulated in middle: cilia whitish-fuscous, with dark fuscous line. Hindwings blackish-fuscous, somewhat lighter in disc; in ♂ with long and rather broad whitish dorsal lobe, ending in tuft of white hairs, and with an ochreous-yellowish costal hair-pencil; cilia whitish, basal third blackish.

6 specimens; 4 Kaholuamano, Kauai, at 4000 feet; 2 Mts. Waimea, Kauai, at 4000 feet; from April to June.

(5) *Mestolobes erinnys*, sp. nov.

♂. 20 mm. Head, palpi, thorax, abdomen, and legs rather dark fuscous. Forewings with termen concave beneath obtusely prominent apex, then prominently rounded; dark purplish-fuscous; first and second lines darker, suffusedly mixed with light ochreous-yellowish, first at $\frac{2}{5}$, sharply angulated above middle, second at $\frac{4}{5}$, nearly straight: cilia fuscous, with darker subbasal line (imperfect). Hindwings dark fuscous; a moderate fuscous dorsal lobe, ending in tuft of fuscous hairs, but no costal hair-pencil; cilia fuscous-whitish, basal third dark fuscous. (Plate VI. fig. 12.)

1 specimen, Waianae Mts., Oahu, at 2200 feet, in April. Differs from all the rest by the peculiar form of forewings.

(6) *Mestolobes arctura*, sp. nov.

♀. 13—14 mm. Head, thorax, and abdomen blackish-fuscous, coppery-tinged, abdomen with genital tuft of densely packed black hair-scales. Palpi blackish mixed with fuscous-whitish. Legs fuscous. Forewings rather narrow, blackish-fuscous, coppery-tinged; first, median, and second lines obscure, grey-purplish, ill-defined, first at $\frac{2}{5}$, slender, angulated above middle, median broad on costal half, hardly marked beneath, second at $\frac{4}{5}$, slender, curved, almost angulated in middle; some light purplish scales on termen: cilia purplish-fuscous, with dark fuscous subbasal line. Hindwings dark fuscous; cilia as in forewings.

2 specimens, Molokai, at 4500 feet, in July and September. The female is distinguished from all others by the singular genital tuft; but if this is connected with oviposition, there may be nothing analogous in the male.

(7) *Mestolobes sirina*, sp. nov.

♂. 12 mm. Head, palpi, thorax, abdomen, and legs dark fuscous. Forewings rather narrow, dark fuscous, slightly coppery-tinged: cilia fuscous, with dark fuscous subbasal line. Hindwings blackish-fuscous; a moderate whitish dorsal lobe, ending in a tuft of whitish hairs, and a whitish costal hair-pencil; cilia as in forewings.

1 specimen, Lanai, at 3000 feet, in July.

(8) *Mestolobes epidelta*, sp. nov.

♀. 14 mm. Head, palpi, thorax, abdomen, and legs dark purplish-fuscous; base of palpi whitish; apex of patagia white; segmental margins white; legs ringed with whitish. Forewings dark fuscous, purplish-tinged; a small triangular white spot on dorsum before middle; a smaller ochreous-whitish spot on costa at $\frac{3}{4}$: cilia whitish, barred with dark fuscous, and with a dark fuscous subbasal line. Hindwings dark fuscous, slightly purplish-tinged; cilia whitish, basal third dark fuscous. (Plate VI. fig. 13.)

1 specimen, Mts. Waimea, Kauai, at 4000 feet, in May.

(9) *Mestolobes iochrysa*, sp. nov.

♀. 13—14 mm. Head dark fuscous, sides of face and edges of collar whitish. Palpi black, obliquely barred with white. Antennae whitish, ringed with dark fuscous. Thorax black, somewhat mixed with whitish. Abdomen blackish, segmental margins whitish. Legs dark fuscous, ringed with whitish. Forewings blackish; an almost basal undefined ochreous-whitish line, space between this and first line wholly ferruginous-ochreous except on costa; first line at $\frac{1}{3}$, whitish, angulated above middle, followed by a similar ferruginous line; median area more or less mixed and on dorsal half mostly suffused with whitish; an undefined 8-shaped discal spot filled with ferruginous; second line at $\frac{4}{5}$, ferruginous, curved, followed by a similar whitish line; an undefined ferruginous subterminal line; a short white costal mark before apex: cilia dark grey, on upper half of termen more or less distinctly barred with white, with a blackish subbasal line. Hindwings blackish; cilia dark grey, with blackish subbasal line. (Plate VI. fig. 14.)

2 specimens, Mts. Waimea, Kauai, at 4000 feet, in May.

(10) *Mestolobes droseropa*, sp. nov.

♀. 17 mm. Head, palpi, and thorax dark fuscous, thorax with a few fuscous-whitish scales. (Abdomen broken.) Legs dark fuscous, ringed with whitish. Forewings dark fuscous, with a few irregularly scattered whitish scales; subbasal line blackish, followed by some whitish scales, interrupted below middle; first and second lines blackish, somewhat mixed with light ochreous-yellowish, first before middle, straight, oblique, second at $\frac{4}{5}$, angulated above middle, edged posteriorly on costa by a whitish mark; an undefined 8-shaped discal spot outlined with blackish, partially filled with light ochreous-yellowish; terminal area beyond this strewn with light ochreous-yellowish scales; a small whitish mark on costa before apex: cilia dark fuscous, basal third blackish-fuscous. Hindwings dark fuscous, somewhat lighter anteriorly; cilia as in forewings.

1 specimen, probably from Kilauea, Hawaii, in August.

(11) *Mestolobes ombrias*, sp. nov.

♂♀. 14—15 mm. Head, palpi, thorax, abdomen, and legs rather dark fuscous. Forewings rather dark fuscous, faintly purplish-tinged; first and second lines thick, dark fuscous, slightly ferruginous-tinged or obscurely mixed with ferruginous centrally, first at $\frac{2}{5}$, slightly curved, second at $\frac{4}{5}$, obtusely angulated about middle, sometimes followed on costa by a small whitish spot; an undefined 8-shaped discal spot similarly coloured; sometimes an undefined darker subterminal shade: cilia fuscous, with dark fuscous subbasal line. Hindwings blackish-fuscous; in ♂ with very small dorsal lobe ending in tuft of fuscous or whitish-fuscous hairs, but without costal hair-pencil; cilia fuscous, basal third dark fuscous. (Plate VI. fig. 15.)

5 specimens; 3 Lanai, at 3000 feet, in July; 2 Molokai, at 3000 feet, in August and September.

(12) *Mestolobes banausa*, sp. nov.

♂. 14—15 mm. Head and thorax ochreous or fuscous, more or less mixed with dark fuscous. Palpi rather dark fuscous. Abdomen rather dark fuscous, somewhat ochreous-sprinkled. Legs dark fuscous ringed with whitish, posterior tibiae suffused with whitish. Forewings fuscous, mixed with dark fuscous; an irregular blackish subbasal line on costal half; dorsal area before first lines sometimes suffused with light yellow-ochreous; first line mixed with ochreous and blackish, angulated above middle, sometimes preceded by a similar whitish line; upper half of median area more or less strewn with whitish; an 8-shaped ochreous discal spot, edged with blackish; second line blackish, marked with ochreous towards costa, posteriorly more or less completely edged with white, rather irregular, angulated in middle; subterminal line more or less indicated with ochreous and whitish: cilia fuscous, with dark fuscous subbasal line, on upper half of termen obscurely barred with whitish. Hindwings dark fuscous, lighter anteriorly; in ♂ with moderate dorsal lobe, ending in tuft of whitish hairs, but no costal hair-pencil; cilia fuscous-whitish, basal third dark fuscous.

♀. Lighter and more ochreous-tinged generally; forewings with first line almost straight, preceding whitish line thicker and more distinct; hindwings lighter or sometimes suffusedly whitish-ochreous towards base.

7 specimens, Kona, Hawaii, at 4000—5000 feet, in July and August.

(13) *Mestolobes minuscula* Butl.

Boreophila minuscula Butl. Ann. Mag. Nat. Hist. (5) VII. 1881, p. 325.
Mestolobes simaethina id. Trans. Ent. Soc. Lond. 1882, p. 38.
Mestolobes minuscula Meyr. Trans. Ent. Soc. Lond. 1888, p. 230.

Abdomen in ♂ beneath with two short tufts of yellowish hairs near base; forewings seldom with median band wholly ochreous; otherwise sufficiently described.

70 specimens; 3 Olaa, Hawaii, at 2000 feet; 2 Kona, Hawaii, at 2000 feet; 6 Kilauea, Hawaii; 1 Wailuku, Maui; 5 Molokai, at 3000 feet; 20 Waianae Mts., Oahu, at 1400—2000 feet; 3 Kaala Mts., Oahu, at 1000—2000 feet; 1 Lanai, at 2000 feet; 27 Lihui, Kauai, at 1500 feet; 2 Kaholuamano, Kauai, at 4000 feet: from February to September, and in November. Also 16 specimens received from Mr Blackburn, who records it from Haleakala, Maui, at 4000 feet.

(14) *Mestolobes ochrias*, sp. nov.

♂. 11—12 mm. Head, palpi, and thorax yellow-ochreous. Abdomen dark fuscous, towards base suffused with yellow-ochreous, segmental margins pale ochreous, beneath with two yellowish tufts near base. Legs pale ochreous-yellowish or whitish-ochreous, anterior and middle pairs sometimes partially banded with dark fuscous. Forewings yellow-ochreous or whitish-ochreous, fuscous-sprinkled; costa marked with very undefined spots of blackish irroration; upper half of subbasal line indicated by blackish irroration; first and second lines somewhat deeper yellow-ochreous, first rather curved, edged with a few dark fuscous scales, preceded by an indistinct whitish fuscous-edged line, second moderately curved, sinuate towards dorsum, posteriorly edged with blackish and followed by a distinct whitish line; a terminal series of cloudy dark fuscous dots: cilia fuscous-whitish with blackish subbasal and grey postmedian line. Hindwings dark fuscous, rather lighter anteriorly; a moderate dorsal lobe ending in a tuft of ochreous-yellow hairs, and an ochreous-yellow costal hair-pencil; cilia whitish, with dark fuscous subbasal line.

2 specimens, Waianae Mts., Oahu, at 2000 feet, in April.

(15) *Mestolobes scleropis*, sp. nov.

♂♀. 16—19 mm. Head, palpi, and thorax fuscous, mixed with pale and dark. Abdomen rather dark fuscous. Legs in ♂ whitish, posterior tibiae roughened with black scales on apical half above, in ♀ fuscous, whitish-ringed. Forewings fuscous, more or less mixed with dark fuscous and sometimes with fuscous-whitish; subbasal line blackish-fuscous on upper half; first and second lines obscurely pale, more or less edged with ochreous suffusion mixed with blackish-fuscous, first rather curved, second irregularly curved, more strongly on median third; an ochreous 8-shaped discal spot, edged with dark fuscous; a terminal series of small cloudy blackish-fuscous spots: cilia fuscous, paler-mixed, with dark fuscous subbasal line. Hindwings dark fuscous becoming lighter anteriorly; in ♂ a small patch of pale yellowish suffusion below middle of disc, a moderately broad whitish-ochreous dorsal lobe ending in a tuft of whitish and dark fuscous hairs, and a yellow-whitish hair-pencil lying in a pale yellowish costal patch; cilia whitish or fuscous-whitish, basal third fuscous. (Plate VI. fig. 16.)

7 specimens, Molokai, at 3000—4500 feet, from June to September.

(16) *Mestolobes eurylyca*, sp. nov.

♂. 15 mm. Head, palpi, and thorax ochreous-fuscous. Abdomen dark fuscous, lighter on back, beneath with two small whitish-ochreous tufts near base. Legs whitish-ochreous, anterior tibiae and tarsi and middle tarsi banded with dark fuscous. Forewings ochreous-fuscous, mixed with dark fuscous; first line represented by a rather broad well-defined slightly curved ochreous-whitish fascia before middle; an obscure ochreous 8-shaped discal spot touching its posterior edge; second line more ochreous, curved, but hardly traceable, followed by a few whitish scales, more distinct on costa; a terminal series of cloudy blackish-fuscous spots: cilia light greyish-ochreous obscurely barred with dark fuscous, with a blackish-fuscous line. Hindwings dark fuscous, lighter anteriorly; a moderately broad rather dark fuscous dorsal lobe, clothed on inner side with whitish and on outer side with blackish-fuscous hairs; a light ochreous curled hair-pencil lying in an ochreous-whitish costal patch; cilia grey-whitish, basal third rather dark fuscous.

1 specimen, Lanai, at 2000 feet, in January.

(17) *Mestolobes orthrias*, sp. nov.

♂. 17 mm. Head and palpi whitish-ochreous, face white. Thorax ochreous-fuscous. Abdomen rather dark fuscous, two basal segments and apical bands of next three ochreous-whitish. Legs ochreous-whitish, anterior tibiae and tarsi and middle tarsi banded with dark fuscous. Forewings ochreous-brown; first line thick, curved, white, anteriorly edged with blackish, posteriorly with yellow-ochreous suffusion; an 8-shaped discal spot obscurely outlined with dark fuscous; second line very obscurely indicated with whitish and dark fuscous scales, slender, curved-bent, forming a more distinct whitish mark on costa; a terminal series of indistinct dark fuscous dots: cilia fuscous, base whitish, with a dark fuscous subbasal line. Hindwings ochreous-white; a moderately broad dark fuscous terminal fascia, becoming suffused beneath and not reaching tornus; a moderate ochreous-whitish dorsal lobe, clothed on both sides with whitish hairs; an ochreous-whitish costal hair-pencil; cilia whitish, basal half grey except towards tornus. (Plate VI. fig. 17.)

1 specimen, Mts. Waimea, Kauai, at 4000 feet, in May.

(18) *Mestolobes pessias*, sp. nov.

♂♀. 15—23 mm. Head, palpi, and thorax whitish-ochreous or whitish, variably mixed with fuscous and dark fuscous. Abdomen fuscous or dark fuscous, segmental margins ochreous-whitish, in ♂ beneath with lateral curled tufts below middle. Legs whitish, variably banded with dark fuscous. Forewings brownish-ochreous or fuscous, sometimes mixed with dark fuscous or whitish; a blackish subbasal line more or less marked on upper half; first line white (seldom pale or obsolete), irregular, angulated above middle, partially dark-edged, often followed by a fascia of whitish suffusion sometimes confluent with it; an 8-shaped ochreous dark-outlined discal spot, sometimes very obscure; second line white (seldom pale or obsolete), anteriorly dark-edged, curved outwards from $\frac{1}{4}$ to $\frac{3}{4}$; a terminal series of dark fuscous spots: cilia ochreous-whitish or seldom fuscous, barred with darker fuscous, and with a dark fuscous subbasal line. Hindwings in ♂ ochreous-whitish, with a moderately broad dark fuscous terminal band, its anterior edge with more or less developed acute projection in middle; in ♀ dark fuscous, darker terminally; in ♂ with moderately broad ochreous-whitish dorsal lobe ending in tuft of black scales, and whitish-ochreous costal hair-pencil; cilia ochreous-whitish, with two more or less marked fuscous or dark fuscous lines. (Plate VI. fig. 18.)

74 specimens, Haleakala, Maui, at 5000 feet, in May. Extremely variable in the development of the white and dark fuscous colouring; the white predominates much more in the ♂ than in the ♀.

(19) *Mestolobes chimonias*, sp. nov.

♂. 20—22 mm. Head, palpi, and thorax brown, somewhat mixed with pale and dark. Abdomen fuscous, segmental margins whitish-ochreous. Legs dark fuscous, ringed with whitish-ochreous, posterior tibiae whitish-ochreous. Forewings fuscous, irregularly mixed with ochreous-whitish and sometimes with dark fuscous; first and second lines slender, whitish, more or less dark-edged and margined on both sides with yellow-ochreous suffusion, first angulated above middle, sometimes nearly followed by a fascia of whitish suffusion, second at $\frac{4}{5}$, middle third curved outwards; an 8-shaped ochreous-tinged discal spot suffusedly outlined with dark fuscous, sometimes almost obsolete; a terminal series of cloudy blackish marks: cilia whitish-ochreous, barred with fuscous, with a dark fuscous line. Hindwings fuscous-grey, somewhat lighter anteriorly; a pale postmedian line faintly indicated; a small dorsal lobe, clothed with ochreous-whitish hairs, but no costal hair-pencil; cilia whitish, indistinctly barred with grey, with dark grey subbasal line.

4 specimens; 2 Haleakala, Maui, at 5000—6000 feet, in March and April; 2 Molokai, at 4500 feet, in September.

(20) *Mestolobes aphrias*, sp. nov.

♂♀. 19—23 mm. Head and thorax fuscous, in ♂ mixed with whitish. Palpi fuscous. Abdomen fuscous, segmental margins whitish. Legs ochreous-whitish, anterior and middle pair in ♂ more or less banded with dark fuscous, in ♀ suffused with rather dark fuscous. Forewings white, in ♂ variably irrorated with fuscous and dark fuscous, in ♀ almost wholly suffused with rather dark fuscous mixed with yellow-ochreous and black; first line in ♂ represented by a moderately broad pale fascia, in ♀ narrower, posteriorly edged with dark fuscous, angularly projecting in middle and near dorsum; an 8-shaped discal spot partially edged with dark fuscous, in ♂ white, in ♀ ochreous; second line white, partially edged with dark fuscous, curved outwards from $\frac{1}{4}$ to $\frac{3}{4}$; a terminal series of cloudy dark fuscous spots: cilia ochreous-whitish indistinctly barred with fuscous, with a dark fuscous line. Hindwings in ♂ whitish-yellowish, with an apical blotch of dark fuscous suffusion, and some dark fuscous irroration along remainder of termen; in ♀ dark fuscous, darker terminally; in ♂ with whitish-yellowish dorsal lobe, terminating in a tuft of hairs with apical half blackish, and a yellowish costal hair-pencil; cilia whitish-yellowish, in ♀ with dark fuscous line.

5 specimens, Kaholuamano, Kauai, at 4000 feet, in April.

(21) *Mestolobes mesacma*, sp. nov.

♂. 14—20 mm. Head and palpi ochreous-whitish, sometimes fuscous-mixed. Thorax fuscous mixed with ochreous-whitish. Abdomen rather dark fuscous, towards base more or less suffused with ochreous-whitish. Legs ochreous-whitish, banded with dark fuscous. Forewings brownish-ochreous, more or less mixed irregularly with dark fuscous; subbasal line blackish on upper half; first line thick, ochreous-white, somewhat curved or nearly straight, posteriorly edged with blackish; an 8-shaped ochreous discal spot outlined with blackish; second line pale ochreous, partially edged with dark fuscous, middle third curved outwards; a terminal series of cloudy dark fuscous spots: cilia fuscous-whitish mixed with fuscous, with a blackish-fuscous subbasal line. Hindwings whitish-yellowish, base whiter; a moderately broad blackish-fuscous terminal fascia, in middle sending a strong wedge-shaped projection inwards to before middle of disc; a moderately broad whitish-yellowish dorsal lobe, ending in a tuft of black hairs; no costal hair-pencil; cilia as in forewings. (Plate VI. fig. 19.)

5 specimens, Molokai, at 3000—4500 feet, from June to August.

(22) *Mestolobes chlorolychna*, sp. nov.

♂. 14—15 mm. Head, palpi, and thorax whitish-ochreous more or less mixed with fuscous. Abdomen dark fuscous, more or less mixed with whitish-ochreous.

Legs ochreous-whitish banded with dark fuscous, posterior tibiae above with dense blackish tuft of hairs before middle. Forewings ochreous-brown or deep yellow-ochreous, more or less sprinkled with dark fuscous; subbasal line indicated by some black scales on upper half; first line represented by a broad ochreous-whitish fascia, anteriorly suffused but extending almost to subbasal line, posterior edge slightly curved, more or less blackish-margined; an 8-shaped discal spot sometimes more yellow-ochreous but hardly defined; second line obscurely pale or fuscous-whitish, sometimes very little marked, sometimes edged anteriorly with yellow-ochreous and blackish scales, middle third curved outwards; a terminal series of indistinct dark fuscous spots: cilia light fuscous, paler-mixed, with dark fuscous subbasal line. Hindwings pale ochreous-yellowish; a moderate blackish-fuscous terminal fascia, with short triangular projection inwards in middle; a moderate ochreous-whitish dorsal lobe, with short black tuft of hairs on inner side and similar light yellowish tuft on outer side, neither reaching apex, which is naked; no costal hair-pencil; cilia ochreous-whitish, basal third rather dark fuscous.

5 specimens, Kona, Hawaii, at 4000 feet, from June to September.

(23) *Mestolobes perixantha*, sp. nov.

♂♀. 13—18 mm. Head and palpi ochreous-whitish to ochreous-yellowish. Thorax ochreous-orange, sometimes mixed with dark fuscous. Abdomen ochreous-yellow, base of segments more or less marked with dark fuscous. Legs pale ochreous-yellowish, more or less banded with dark fuscous. Forewings ochreous-orange, very variably irrorated with dark fuscous (very densely, or partially, or hardly at all), sometimes mixed with white in disc and towards base; first line thick, white, rather curved, anteriorly edged with blackish-fuscous; an 8-shaped discal spot outlined with dark fuscous or almost obsolete, in one specimen preceded by a similar white spot; second line slender, white, sometimes little marked, middle third curved outwards: cilia ochreous-yellowish or fuscous-whitish, variably or not mixed with dark fuscous. Hindwings ochreous-yellow; a very variable dark fuscous terminal fascia, sometimes occupying posterior half of wing, or narrow, or reduced to an apical suffusion, or almost wholly obsolete; in ♂ a rather long broad ochreous-whitish dorsal lobe, clothed on sides with pale yellowish hairs, and an ochreous-yellow costal hair-pencil; cilia pale yellowish, sometimes with fuscous line. (Plate VI. fig. 20.)

10 specimens; 9 Mts. Waimea, Kauai, at 4000 feet; 1 Kaholuamano, Kauai, at 4000 feet; from April to June. Exceedingly variable.

(24) *Mestolobes semiochrea* Butl.

Mestolobes semiochrea Butl. Trans. Ent. Soc. Lond. 1882, p. 39; Meyr. op. id. 1888, p. 229.

♂. 13—14 mm. Forewings with lines sometimes little marked; an ochreous 8-shaped discal spot obscurely darker-outlined; otherwise sufficiently described.

3 specimens, Waianae Mts., Oahu, in April. Mr Blackburn's examples were from the same island "in mountains near Honolulu."

(25) *Mestolobes pragmatica*, sp. nov.

♂. 13—14 mm. Head and thorax ochreous-whitish, thinly mixed with dark fuscous. Palpi ochreous-whitish. Abdomen dark fuscous, segmental margins more or less broadly ochreous-whitish, beneath with two small curled ochreous-whitish tufts near base. Legs whitish, anterior and middle pair banded with dark fuscous. Forewings fuscous, partially ochreous-tinged, mixed with dark fuscous, especially on median band, which is sometimes wholly suffused with dark fuscous; basal area irregularly mixed and spotted with white; first and second lines white, first sinuate, forming a wedge-shaped projection inwards in middle, second slender, curved outwards from $\frac{1}{4}$ to $\frac{3}{4}$; an 8-shaped discal spot obscurely indicated: cilia ochreous-whitish, with a dark fuscous line. Hindwings ochreous-white; a moderate irregular dark fuscous fascia along upper half of termen; a rather long whitish dorsal lobe, ending in a tuft of whitish hairs of which apical third is black; no costal hair-pencil; cilia ochreous-whitish, with fuscous subbasal line on upper half of termen.

4 specimens, Olaa, Hawaii, from July to September.

(26) *Mestolobes abnormis* Butl.

Metasia abnormis Butl. Trans. Ent. Soc. Lond. 1882, p. 35 (♀).
Mestolobes oenone id. l. c., p. 37 (♂).
Mestolobes abnormis Meyr. Trans. Ent. Soc. Lond. 1888, p. 228.

Sufficiently described; but the tufts of the dorsal lobe, which I have described as black, should have been correctly described as having the apical portion black, the rest whitish.

1 specimen, Panoa Valley, Oahu, in November; this is a variety having an oblique trapezoidal ochreous-white blotch in disc of forewings, extending from above middle of first line to termen above tornus, but otherwise normal. Six specimens received from Mr Blackburn, who took them flying in the sunshine in a torrent-bed near Honolulu, Oahu.

(27) *Mestolobes autodoxa*, sp. nov.

♂♀. 12—14 mm. Head, palpi, and thorax fuscous, sometimes ochreous-tinged. Abdomen dark fuscous, segmental margins in ♂ whitish towards base. Legs whitish, anterior and middle pair banded with dark fuscous. Forewings fuscous, more or less mixed with dark fuscous; first line obscurely pale or almost obsolete, followed by some ochreous and dark fuscous scales; an 8-shaped discal spot very obscurely indicated; second line pale or whitish-ochreous, slender, curved outwards from $\frac{1}{4}$ to $\frac{3}{4}$: cilia fuscous, paler-mixed, with a dark fuscous line. Hindwings in ♂ ochreous-white, more yellowish-tinged dorsally, with moderate dark fuscous fascia along upper half of termen, in ♀ rather dark fuscous, becoming blackish-fuscous posteriorly, with a patch of whitish suffusion in middle of disc; in ♂ with rather long ochreous-whitish dorsal lobe, clothed with long whitish hairs, and a whitish-yellowish costal hair-pencil; cilia whitish, with dark fuscous subbasal line in ♂ on upper half of termen, in ♀ throughout. (Plate VI. fig. 21.)

4 specimens, Waianae Mts., Oahu, at 1400 feet, in April. Very similar to *M. abnormis*, yet the ♂ differs widely in the wholly whitish hairs of the dorsal lobe, and the absence of the black tibial tuft.

(28) *Mestolobes homalopa*, sp. nov.

♂♀. 16—20 mm. Head, palpi, and thorax pale greyish-ochreous or whitish-ochreous, sometimes fuscous-sprinkled. Abdomen in ♂ fuscous, segmental margins whitish-ochreous, in ♀ darker fuscous. Legs ochreous-whitish, anterior pair sometimes banded with dark fuscous. Forewings pale ochreous, sometimes yellowish-tinged, more or less irrorated with fuscous, in ♀ sometimes suffused with fuscous; a few scattered dark fuscous scales, but no defined markings: cilia fuscous, paler-mixed. Hindwings fuscous, becoming dark fuscous towards termen; in ♂ a moderately long ochreous-whitish dorsal lobe, clothed with long whitish hairs on inner side, and a ridge of erect curled hair-scales along costa towards middle; cilia fuscous.

12 specimens, Haleakala, Maui, at 5000 feet, in May.

ORTHOMECYNA *Butl.*

In the hindwings 7 is sometimes connate with 6, and sometimes anastomoses more or less shortly with 8; the characters given are otherwise sufficient. The pecten of hairs on the lower median vein is as well-defined as in the Crambidae, whereas in *Mestolobes* there is no trace of it.

1. Hindwings clear orange or yellowish .... 2.
 ,, at most greyish-yellowish, or partly yellow-suffused .... 6.
2. Cilia of hindwings fuscous .... (*8*) *epicausta.*
 ,, ,, yellow or orange .... 3.
3. Forewings irrorated or suffused with whitish .... (*11*) *mesochasma.*
 ,, not whitish-irrorated .... 4.
4. Hindwings suffused with dark fuscous towards costa .... (*7*) *albicaudata.*
 ,, not dark fuscous towards costa .... 5.

5. Genital tuft of ♂ whitish ....(*6*) *chrysophanes.*
,, ,, black ....(*5*) *alloptila.*
6. Hindwings with more or less yellowish suffusion ....7.
,, wholly without yellowish suffusion ....12.
7. Forewings with lines distinctly black-edged ....8.
,, ,, obscure, not black-edged ....9.
8. Hindwings pale greyish-yellowish, with grey terminal band ....(*12*) *cupreipennis.*
,, dark grey, with two streaks of yellowish suffusion ....(*13*) *exigua.*
9. Hindwings mostly pale greyish-yellowish ....10.
,, at most with two very indistinct streaks of yellowish suffusion......11.
10. Abdomen yellow-ochreous ....(*10*) *aphanopis.*
,, slaty-fuscous ....(*9*) *picrodes.*
11. Forewings with first and second lines closely approximated dorsally ...(*2*) *phaeophanes.*
,, ,, ,, not closely approximated ....(*4*) *crossias.*
12. Forewings distinctly ochreous ....13.
,, more grey or dark fuscous ....14.
13. Hindwings whitish-fuscous ....(*3*) *heterodyas.*
,, dark fuscous..(*2*) *phaeophanes.*
14. Forewings whitish-irrorated ....(*14*) *amphilyca.*
,, not whitish-irrorated..(*1*) *metalycia.*

(1) *Orthomecyna metalycia*, sp. nov.

♂. 22—25 mm. Head, palpi, thorax, abdomen, and legs ochreous-fuscous. Forewings rather broad, rather dark fuscous, more or less suffusedly irrorated with whitish-ochreous, especially on basal area; first and second lines whitish-ochreous, ill-defined or sometimes almost obsolete, first hardly oblique, triangularly indented outwards above middle, posteriorly dark-edged, second moderately curved outwards from beneath costa to $\frac{2}{3}$; an indistinct darker transverse mark representing discal spot; a waved whitish-ochreous almost terminal line, seldom obsolete: cilia fuscous mixed with whitish-ochreous, with a darker line. Hindwings rather dark fuscous, darker posteriorly; cilia whitish-ochreous, sometimes fuscous-tinged, basal third fuscous. (Plate VI. fig. 22.)

5 specimens, Kona, Hawaii, at 4000 feet, from July to September.

(2) *Orthomecyna phaeophanes*, sp. nov.

♂♀. 17—29 mm. Head, palpi, thorax, and abdomen ochreous-fuscous or ochreous-brown, sometimes mixed with dark fuscous. Legs whitish-fuscous, sometimes banded with dark fuscous. Forewings rather elongate, ochreous-brown or ochreous-fuscous, sometimes mostly suffused with dark fuscous; first and second lines lighter ochreous, very obscure or sometimes obsolete, internally dark-edged, closely approximated dorsally, first oblique, more or less triangularly indented outwards above middle, second moderately curved outwards from near costa to $\frac{3}{5}$;

sometimes a cloudy dark fuscous discal dot; sometimes obscure lighter subterminal and terminal shades, separated by a sometimes well-marked waved dark fuscous line: cilia ochreous-fuscous, tips paler. Hindwings dark fuscous; sometimes very obscure streaks of yellowish suffusion below middle and towards costa posteriorly; cilia light yellowish, more or less fuscous-mixed towards base.

14 specimens; 6 Haleakala, Maui, at 4000—5000 feet; 2 Waianae Mts., Oahu, at 2000—3000 feet; 4 Molokai, at 3000—4000 feet; 2 Kauai, at 4000 feet; from April to June, and in September. Varies considerably, whilst always very obscure; from *O. metalycia* it differs in the narrower forewings, ochreous colouring, and dorsally closely approximated first and second lines.

(3) *Orthomecyna heterodyas*, sp. nov.

♂. 25—28 mm. Head, palpi, thorax, abdomen, and legs brownish-ochreous, fuscous-tinged. Forewings rather elongate, brownish-ochreous, distinctly yellowish-tinged, sprinkled with fuscous; first and second lines cloudy, whitish, first irregular, second curved outwards on upper $\frac{3}{5}$: cilia fuscous-whitish, mixed with brownish-ochreous (imperfect). Hindwings whitish-fuscous, becoming fuscous towards termen; cilia as in forewings. (Plate VI. fig. 23.)

2 specimens, Kilauea, Hawaii, in June and August.

(4) *Orthomecyna crossias*, sp. nov.

♂♀. 23—28 mm. Head and thorax dark fuscous, somewhat mixed with light ochreous-yellowish. Palpi dark fuscous. Abdomen pale yellow-ochreous, in ♂ little, in ♀ mostly suffused with fuscous. Legs dark fuscous, ringed with pale yellow-ochreous. Forewings elongate, brown, densely irrorated with dark fuscous; first and second lines indicated by a diffused ochreous-yellow irroration, only defined on costa, where it forms two well-marked yellowish spots; a more or less marked yellowish suffusion towards middle of costa; a small undefined dark fuscous discal spot, in ♂ followed by a subquadrate white spot, and connected with middle of dorsum by a broad irregular whitish suffusion; an undefined ochreous dentate line resting on termen: cilia ochreous-yellowish mixed with dark fuscous. Hindwings fuscous, becoming dark fuscous posteriorly; very obscure streaks of yellowish suffusion beneath middle of disc, and towards costa posteriorly; cilia ochreous-yellowish, base in ♀ mixed with dark fuscous.

2 specimens, Oahu, at 2000 feet, in April.

(5) *Orthomecyna alloptila*, sp. nov.

♂. 18—21 mm. Head, palpi, and thorax ochreous-orange, palpi somewhat infuscated. Abdomen light orange, apex whitish, genital tuft of ♂ black. Legs ochreous-whitish, anterior pair obscurely banded with fuscous. Forewings elongate, ochreous-orange, suffused towards termen with fuscous; first and second lines hardly paler, closely approximated dorsally, median band somewhat infuscated, first straight, oblique, second curved on upper half; a small undefined darker fuscous discal spot: cilia ochreous-yellowish or fuscous, basal half darker fuscous. Hindwings light orange; a narrow longitudinal median streak, a broader dorsal streak, and a rather narrow irregular terminal fascia cloudy dark fuscous; cilia light orange, tips paler.

3 specimens, Kilauea, Hawaii, in June and August.

(6) *Orthomecyna chrysophanes*, sp. nov.

♂♀. 18—24 mm. Head, palpi, and thorax brownish-ochreous to ochreous-orange. Abdomen pale orange, towards apex more or less whitish, genital tuft of ♂ whitish. Legs pale yellowish or ochreous-whitish, anterior and middle pair more or less banded with fuscous. Forewings rather elongate, ochreous-orange, more or less irrorated or in one specimen wholly suffused with fuscous, usually clearer orange towards middle of costa; first and second lines hardly indicated except by cloudy dark fuscous internal margins, which are closely approximated dorsally, first nearly straight, irregular, second curved outwards on upper half; a small undefined dark fuscous discal spot, seldom with an ochreous-whitish spot beyond it and another below it; sometimes a fuscous shade beyond second line; usually slender darker fuscous subterminal and terminal lines, sometimes suffused together as a narrow fascia: cilia fuscous, with a dark fuscous line. Hindwings light orange; usually a more or less developed narrow dark fuscous terminal fascia, with a triangular projection inwards in middle, often interrupted below middle or much reduced or sometimes wholly obsolete; sometimes a narrow median streak of dark fuscous irroration, and a broader dorsal streak; cilia light orange, tips yellow-whitish. (Plate VI. fig. 24.)

14 specimens; 13 Mts. Waimea, Kauai, at 4000 feet; 1 Kaholuamano, Kauai, at 4000 feet; from April to June. Very variable.

(7) *Orthomecyna albicaudata* Butl.

Orthomecyna albicaudata Butl. Ent. Mo. Mag. XIX. p. 178; Meyr. Trans. Ent. Soc. Lond. 1888, p. 226.

Sufficiently described.

One specimen, Lanai, at 3000 feet, in July. Mr Blackburn's specimens were from the same island.

(8) *Orthomecyna epicausta*, sp. nov.

♂♀. 13—20 mm. Head, palpi, and thorax dark fuscous, sometimes mixed with whitish-ochreous. Abdomen ochreous or fuscous, towards apex whitish, genital tuft of ♂ blackish. Legs ochreous-whitish, anterior pair banded with fuscous. Forewings elongate, rather dark brown, more or less mixed and posteriorly or sometimes wholly suffused with dark fuscous; first and second lines obscurely pale or brownish-ochreous, often obsolete, approximated dorsally, first irregular, second curved on upper $\frac{2}{5}$, sometimes united to form a distinct whitish-ochreous dorsal blotch; a very obscure dark fuscous discal spot: cilia fuscous, with two suffused darker lines. Hindwings ochreous-yellow or whitish-yellowish; a moderately broad blackish-fuscous terminal fascia, more or less extended along dorsum; often a narrow median longitudinal streak of dark fuscous irroration, and another less marked beneath costa; cilia fuscous, sometimes becoming yellow-whitish towards tornus. (Plate VI. fig. 25.)

30 specimens, Kona, Hawaii, at 4000—6000 feet, from June to September.

(9) *Orthomecyna picrodes*, sp. nov.

♂♀. 21—23 mm. Head, palpi, thorax, abdomen, and legs rather dark slaty-fuscous. Forewings rather elongate, slaty-fuscous, darker-sprinkled, in ♀ whitish-sprinkled towards termen; first and second lines in ♂ obsolete, in ♀ obscurely whitish, first obtusely bent in middle, second curved on upper $\frac{2}{5}$; in ♀ a very obscure dark discal dot: cilia fuscous, somewhat whitish-mixed, with darker subbasal line. Hindwings grey; a dull whitish-yellowish grey-sprinkled suffusion occupying whole of disc except an obscure median longitudinal streak; cilia as in forewings. (Plate VI. fig. 26.)

2 specimens, Hualalai, Hawaii, at 8000 feet, in August.

(10) *Orthomecyna aphanopis* Meyr.

Orthomecyna aphanopis Meyr. Trans. Ent. Soc. Lond. 1888, p. 227.

No specimens sent by Mr Perkins. The locality for this species is unrecorded, but probably it was Maui or Oahu, as most of Mr Blackburn's other specimens were thence.

(11) *Orthomecyna mesochasma*, sp. nov.

♂♀. 18—21 mm. Head, palpi, and thorax whitish mixed with grey. Abdomen light ochreous-yellow. Legs whitish, banded with grey. Forewings rather elongate, fuscous, much irrorated or sometimes suffused with whitish; first and second lines whitish, sometimes edged internally with dark fuscous, first almost straight, somewhat indented in middle, second curved on upper $\frac{3}{5}$; an undefined dark fuscous discal dot, and sometimes a second above it; subterminal line cloudy, dentate, whitish, sometimes obsolete: cilia fuscous, more or less whitish-mixed, with darker subbasal line. Hindwings clear ochreous-yellow; median and subdorsal streaks of blackish-grey irroration; a moderately broad blackish-grey terminal band, sharply interrupted on a quadrate space below middle; cilia light yellow, tips paler. (Plate VII. fig. 1.)

7 specimens; 3 Kaholuamano, Kauai, at 4000 feet; 4 Mts. Waimea, Kauai, at 4000 feet; from April to June, and in October.

(12) *Orthomecyna cupreipennis* Butl.

Orthomecyna exigua, var. *cupreipennis* Butl. Ent. Mo. Mag. XIX. p. 179.

♂. 18—20 mm. Abdomen light ochreous-yellowish. Forewings as in *O. exigua*. Hindwings pale dull ochreous-yellowish, faintly greyish-tinged; a moderate dark grey terminal band; cilia pale whitish-ochreous, suffused with grey towards base.

1 specimen, Lanai, at 2000 feet, in February. Several were obtained by Mr Blackburn from the same island, and as the differential characters appear to be constant, I think it advisable to allow the form specific rank.

(13) *Orthomecyna exigua* Butl.

Mecyna exigua Butl. Ent. Mo. Mag. XV. p. 271; Ann. Mag. Nat. Hist. (5) VII. 1881, p. 329.

Orthomecyna exigua Meyr. Trans. Ent. Soc. Lond. 1888, p. 227.

Abdomen varying from pale ochreous to grey; forewings usually more or less irrorated or sometimes much suffused with whitish; cilia of hindwings sometimes suffused with greyish. Otherwise sufficiently described.

19 specimens; 18 Molokai, at 3000—4000 feet; 1 Kilauea, Hawaii; in May, June, and September. Also taken commonly by Mr Blackburn in Maui.

(14) *Orthomecyna amphilyca*, sp. nov.

♂. 16—22 mm. Head, palpi, and thorax fuscous-grey. Abdomen greyish-ochreous. Legs dark grey, obscurely whitish-ringed. Forewings grey, irrorated with dark fuscous and whitish; first and second lines whitish, internally edged with some blackish scales, first angulated above middle, second curved on upper $\frac{3}{5}$; a small undefined blackish-fuscous discal spot; an undefined whitish subterminal line, followed by a row of blackish dots: cilia grey mixed with whitish, with a dark fuscous line. Hindwings whitish-ochreous densely irrorated throughout with fuscous, with a somewhat darker terminal band; cilia whitish, with a fuscous line.

2 specimens, Haleakala, Maui, at 9000 feet, in October.

PROTAULACISTIS, gen. nov.

Face rounded, oblique; ocelli present; tongue developed. Antennae $\frac{3}{4}$, in ♂ pubescent. Labial palpi moderately long, porrected, second joint with dense projecting scales attenuated forwards, terminal joint concealed. Maxillary palpi moderate, terminally dilated with loose scales. Tibial outer spurs $\frac{3}{4}$. Forewings normal. Hindwings with veins 3, 4, 5 closely approximated at base, 7 out of 6 near origin, anastomosing with 8 to near middle, lower median without distinct pecten; in ♂ with subdorsal groove above containing loose hair-pencil.

Although the ♂ has the subdorsal groove as in the preceding genus, all the veins of the hindwings are present in both sexes. The character of the markings is quite that of the *Pyrausta* group.

(1) *Protaulacistis cataphaea*, sp. nov.

♂♀. 17—21 mm. Head, palpi, thorax, abdomen, and legs rather dark fuscous. Forewings rather dark fuscous, strewn with ochreous-brown scales; roundish orbicular and 8-shaped discal spot very obscurely darker-outlined, sometimes obsolete; second line dark fuscous, very obscure, curved, waved, forming an abrupt loop inwards beneath discal spot; a terminal series of indistinct dark fuscous dots: cilia fuscous, with two faint darker lines. Hindwings dark fuscous, slightly purplish-tinged, darker terminally; cilia grey, with darker subbasal line, tips whitish. (Plate VII. fig. 2.)

13 specimens, Haleakala, Maui, at 6000 feet, in May.

SCOPARIA *Haw.*

I have recently come to the conclusion that *Xeroscopa* cannot be advantageously maintained as distinct from *Scoparia*, the point of distinction being so slight and sometimes hardly appreciable, whilst in other respects, structural and superficial, there is no difference at all. Probably all the following species show more or less of the discal hairs characteristic of *Xeroscopa*, though in some cases they are apparently reduced to the merest rudiment. All the species have the forewings comparatively narrow, some very narrow.

1. Forewings with rhomboidal black patch along central third of costa ....2.
,, without such patch ....4.
2. Costal patch enclosing an elongate white costal spot....................*(3) amphicypella.*
,, without white spot ....3.
3. Posterior edge of costal patch inwardly oblique ....*(2) rhombias.*
,, ,, outwardly oblique ....*(1) tetranesa.*
4. Forewings with entire black subterminal fascia ....5.
,, without such fascia ....11.
5. Upper half of discal spot filled with white ....*(14) thalamias.*
,, ,, absorbed in black costal bar ....6.
6. Groundcolour of forewings pale ochreous-yellowish ....*(11) tyraula.*
,, ,, white or ochreous-white....................7.
7. Antemedian black fascia connected in disc with postmedian bar ......*(12) pentaspila.*
,, ,, not so connected ....8.
8. Antemedian black fascia connected in disc with subbasal fascia ....9.
,, ,, not so connected ....10.
9. Connection broad; hindwings grey-whitish ....*(7) orthoria.*
,, narrow; hindwings grey ....*(8) mesoleuca.*
10. Head mixed with black... ....*(10) antimacha.*
,, not mixed with black ....*(9) miantis.*
11. Groundcolour of forewings uniform shining ashy-grey ....*(26) siderina.*
,, ,, not uniform grey ....12.
12. Forewings with groundcolour orange or ferruginous ....13.
,, ,, not orange or ferruginous ....16.
13. First line well-marked, white ....14.
,, hardly defined ....*(36) nyctombra.*
14. Orbicular and claviform blackish ....15.
,, ,, not blackish ....*(28) ianthes.*
15. Second line reduced in disc to dots ....*(29) marmarias.*
,, entire in disc....................*(30) aeolias.*
16. First line doubled, well-marked, yellowish-tinged ....17.
,, not doubled, or if so, not yellowish ....19.
17. Head yellowish-fuscous; hindwings grey....................*(40) zophochlora.*
,, yellowish on crown; hindwings whitish-grey ....18.
18. Orbicular obliquely beyond claviform ....*(39) melichlora.*
,, vertically above claviform....................*(41) hawaiiensis.*
19. Head and thorax shining coppery ....*(34) erebochalca.*
,, ,, not coppery ....20.
20. Head yellowish, or mixed with yellowish ....21.
,, not yellowish ....22.
21. Lines white ....*(31) nectarias.*
,, pale yellowish ....*(27) parachlora.*
22. Head clear white, at most with black frontal bar, or face sprinkled with black ....23.
,, more or less wholly mixed or suffused with fuscous or blackish ....34.
23. Discal spot 8-shaped ....24.
,, absorbed in black costal bar....................25.
24. Thorax black-sprinkled ....*(16) halirrhoa.*
,, not black-sprinkled ....*(17) actias.*

25. Posterior edge of subbasal fascia angulated, lower portion inwardly oblique ......26.
,, ,, not so formed ......28.
26. Forewings sprinkled with black ......(*6*) *passalota.*
,, not sprinkled with black ......27.
27. Posterior edge of antemedian fascia with middle third triangularly dilated...(*4*) *oxythyma.*
,, ,, ,, with upwards-oblique quadrate median
projection ......(*5*) *balanopis.*
28. Orbicular and claviform separate, distinct ......(*15*) *loxocentra.*
,, ,, confluent together or with antemedian fascia ......29.
29. Spot representing orbicular and claviform connected with postmedian bar......30.
,, ,, ,, not so connected ......33.
30. Forewings more or less sprinkled with black ......31.
,, not sprinkled with black ......32.
31. Apical black blotch enclosing an oblique white apical mark ......(*23*) *cryerodes.*
,, ,, without such mark ......(*13*) *pachysema.*
32. Spot representing orbicular and claviform quadrate ......(*20*) *struthias.*
,, ,, ,, pentagonal ......(*19*) *formosa.*
33. Orbicular and claviform forming a trilobate projection of antemedian fascia (*21*) *triacma.*
,, ,, an 8-shaped spot, at most connected towards extremities with fascia ......(*22*) *jucunda.*
34. Forewings with veins white-streaked, other markings obsolete ......(*57*) *venosa.*
,, ,, not white-streaked, markings more or less distinct ......35.
35. Forewings with a fine blackish line along submedian fold throughout......(*48*) *peronetis.*
,, without such line ......36.
36. First line sharply angulated below middle ......37.
,, not angulated below middle ......38.
37. Subterminal line obsolete ......(*46*) *epimystis.*
,, ,, distinct ......(*47*) *frigida.*
38. Forewings with defined blackish subbasal fascia ......39.
,, without such fascia ......44.
39. Orbicular white, blackish-edged ......(*44*) *dactyliopa.*
,, black ......40.
40. Orbicular and claviform merged in dark suffusion of first line ......(*43*) *demodes.*
,, ,, distinct ......41.
41. Orbicular and claviform confluent into an 8-shaped spot ......42.
,, ,, separate ......43.
42. Postmedian bar connected beneath with apical blotch ......(*24*) *crataea.*
,, not so connected ......(*18*) *melanocephala*
43. Orbicular rather obliquely beyond claviform ......(*42*) *empeda.*
,, vertically above claviform ......(*25*) *ombrodes.*
44. Lines almost obsolete ......(*56*) *omichlopis.*
,, more or less marked ......45.
45. Forewings with groundcolour fuscous or dark fuscous, sometimes orange-tinged...46.
,, ,, whitish ......51.
46. Forewings dark, tinged with yellowish, orange, or coppery ......47.
,, appearing grey, without such tinge ......50.
47. Claviform conspicuous, blackish ......48.
,, little marked ......49.
48. Claviform separate ......(*37*) *clonodes.*
,, connected with dark margin of first line ......(*32*) *bucolica.*

49. Forewings orange-tinged .... *(35) oenopis.*
    ,, not orange-tinged .... *(38) thyellopis.*
50. Orbicular obsolete .... *(50) melanopis.*
    ,, distinct .... *(49) ischnias.*
51. Claviform conspicuous, black .... *(33) pyrseutis.*
    ,, obsolete or merged in dark margin of first line .... 52.
52. Dark markings suffused with brown .... *(54) platyscia.*
    ,, without brown tinge .... 53.
53. Expanse 13 mm. or less .... *(45) geraea.*
    ,, 14 mm. or more .... 54.
54. First line indented in middle .... 55.
    ,, not indented in middle .... 56.
55. Orbicular elongate or dash-like, blackish .... *(55) probolaea.*
    ,, not dash-like .... *(51) macrophanes.*
56. Orbicular forming a distinct black dot .... *(53) halmaea.*
    ,, not distinct or dot-like .... *(52) meristis.*

(1) *Scoparia tetranesa*, sp. nov.

♀. 16 mm. Head and thorax white, shoulders black. Palpi black, base and tips white. Abdomen whitish. Forewings white; a moderate black almost basal fascia, sharply angulated below middle; a rhomboidal black patch extending along costa from before $\frac{1}{3}$ to before $\frac{2}{3}$, lower anterior angle touching middle of dorsum, lower posterior angle in disc at $\frac{3}{4}$; a small undefined oblique blackish costal mark at $\frac{4}{5}$; a moderate black apical spot, and smaller tornal spot: cilia white. Hindwings whitish-grey, terminally suffused with grey, more broadly at apex; cilia grey-whitish, with a grey basal line. (Plate VII. fig. 3.)

1 specimen, Haleakala, Maui, at 5000 feet, in October.

(2) *Scoparia rhombias*, sp. nov.

♂♀. 16—17 mm. Head and thorax white, shoulders black. Palpi black, base and tips white. Abdomen light grey, segmental margins white. Forewings ochreous-white; a moderate black almost basal fascia, sharply angulated about middle; a rhomboidal black patch extending along costa from beyond $\frac{1}{4}$ to $\frac{3}{5}$, lower anterior angle not reaching middle of dorsum, but sometimes connected with it by a few black scales, lower posterior angle in disc at $\frac{3}{5}$; two small undefined marks of blackish or grey irroration on costa towards apex, and sometimes a smaller one on tornus; a terminal series of blackish dots, sometimes incomplete: cilia white. Hindwings grey-whitish or whitish-grey, suffused with grey towards apex; cilia whitish.

5 specimens; 4 Kaholuamano, Kauai, at 4000 feet, in April; 1 Molokai, at 4000 feet, in June.

(3) *Scoparia amphicypella*, sp. nov.

♂. 18 mm. Head and thorax white, shoulders black. Palpi black, base and tips white. Abdomen grey, segmental margins white. Forewings white; a moderate blackish almost basal fascia, sharply angulated below middle; a rhomboidal blackish patch extending on costa from before $\frac{1}{3}$ to before $\frac{2}{3}$, lower angles prominent, anterior not reaching dorsum, posterior in disc at $\frac{2}{3}$, enclosing an elongate semioval white costal spot; an inwardly oblique oblong blackish anteapical spot, and a smaller praetornal spot: cilia white. Hindwings grey-whitish, terminally suffused with grey; cilia whitish. (Plate VII. fig. 4.)

1 specimen, Mts. Waimea, Kauai, at 4000 feet, in May.

(4) *Scoparia oxythyma*, sp. nov.

♂♀. 15—18 mm. Head and thorax white, shoulders with a black spot. Palpi white, with black median bar. Abdomen bronzy-ochreous, segmental margins white. Forewings white; a moderate black almost basal fascia, sharply angulated about middle; a narrow black oblique fascia from $\frac{1}{3}$ of costa to middle of dorsum, middle third triangularly dilated posteriorly; an oblique black bar from $\frac{2}{3}$ of costa, reaching half across wing, lower extremity excavated; a black praetornal spot; an inwardly oblique oblong black anteapical spot, preceded by a black costal dot; two or three black sometimes confluent terminal dots towards middle: cilia white. Hindwings whitish-grey, terminally suffused with grey; cilia white.

11 specimens; 5 Mts. Waimea, Kauai, at 4000 feet; 6 Kaholuamano, Kauai, at 4000 feet; from April to June. This and the following species differ from those most similar to them by the broader white apical portion of the palpi, which reduces the black central portion to a comparatively narrow bar.

(5) *Scoparia balanopis*, sp. nov.

♂♀. 15—17 mm. Head and thorax white, shoulders black. Palpi white, with black median bar. Abdomen ochreous-whitish, in ♂ more ochreous-tinged. Forewings white or ochreous-white; a moderate black almost basal fascia, angulated below middle; a narrow black oblique fascia from $\frac{1}{3}$ of costa to middle of dorsum, anterior edge with a triangular central prominence, posterior with a strong upwards-oblique quadrate median projection; an oblique black bar from $\frac{2}{3}$ of costa, reaching half across wing, lower extremity excavated; a black praetornal spot; an inwardly oblique oblong black anteapical spot, preceded by a black costal dot; a terminal series of more or less defined black dots, in middle usually coalescing into a triangular spot: cilia white. Hindwings whitish-grey, suffused with grey towards termen, sometimes with a pale posterior line; cilia white. (Plate VII. fig. 5.)

11 specimens; 3 Kona, Hawaii, at 4000 feet; 5 Olaa, Hawaii, at 2000 feet; 3 Hilo, Hawaii, at 2000 feet; in July, September, November, and December.

(6) *Scoparia passalota*, sp. nov.

♂♀. 16—20 mm. Head white, face sometimes with blackish bar. Palpi blackish, base and tips white. Thorax white, a spot on shoulders and central dorsal spot black. Abdomen greyish-ochreous, segmental margins whitish. Forewings white, more or less sprinkled with black, dorsal half sometimes mixed with grey and irrorated with black; a moderate black almost basal fascia, sharply angulated in middle; a narrow oblique black fascia from beyond $\frac{1}{4}$ of costa to before middle of dorsum, posterior edge with strong upwards-oblique subquadrate median projection; a moderate oblique black bar from costa before $\frac{2}{3}$, reaching half across wing, lower extremity excavated; anterior edge of second line more or less distinctly blackish, forming small spots at extremities; a rhomboidal black praetornal spot, broadest above; an inwardly oblique oblong black anteapical spot, connected beneath with a triangular black spot on middle of termen; a terminal series of undefined black dots: cilia pale fuscous, somewhat whitish-mixed, with interrupted darker subbasal line. Hindwings pale grey, terminally suffused with grey; cilia fuscous-whitish, with light fuscous subbasal line.

8 specimens; 7 Haleakala, Maui, at 5000 feet; 1 Lahaina, Maui, at 3000 feet; in April and May. Undoubtedly allied to the preceding species in essential characters, though differing much in the diffusion of black scales.

(7) *Scoparia orthoria*, sp. nov.

♂♀. 14—16 mm. Head ochreous-white. Palpi black, tips and base white. Thorax ochreous-white, shoulders and a central dorsal spot black. Abdomen pale greyish-ochreous, segmental margins broadly white. Forewings ochreous-white; a very broad oblique black almost basal fascia; a broad oblique black fascia from beyond $\frac{1}{3}$ of costa to beyond middle of dorsum, narrowed beneath, produced on dorsum posteriorly, on upper half confluent with subbasal fascia except on costa; a rather broad oblique black bar from costa before $\frac{2}{3}$, reaching half across wing, lower extremity sometimes excavated, more or less confluent beneath with following fascia; a broad irregular black subterminal fascia, sometimes including a white costal dot; a terminal series of black dots, sometimes forming a median spot connected with preceding fascia: cilia white. Hindwings grey-whitish or whitish-grey, terminally suffused with grey; a suffused grey discal spot; cilia white. (Plate VII. fig. 6.)

4 specimens, Olaa, Hawaii, at 2000 feet, in June, July, and November.

(8) *Scoparia mesoleuca*, sp. nov.

♂♀. 15—17 mm. Head ochreous-white, with small black spot before antennae. Palpi black, tips and base white. Thorax ochreous-white, a spot on shoulders and a central dorsal spot black. Abdomen brownish-ochreous, segmental margins white. Forewings ochreous-white; a broad black oblique almost basal fascia; a broad black oblique fascia from $\frac{1}{3}$ of costa to middle of dorsum, abruptly narrowed dorsally, followed by some black scales on dorsum, connected in middle with subbasal fascia; a moderately broad oblique black bar from costa about $\frac{2}{3}$, reaching half across wing, lower extremity excavated, confluent beneath with following fascia; a broad irregular black subterminal fascia, including a white costal dot; a terminal series of black dots, sometimes forming a median spot connected with preceding fascia: cilia white. Hindwings grey, darker terminally; cilia whitish.

7 specimens, Mts. Waimea, Kauai, at 3000—4000 feet, in May and June.

(9) *Scoparia miantis*, sp. nov.

♂. 14 mm. Head ochreous-white. Palpi black, base and tips white. Thorax ochreous-white, a spot on shoulders and small undefined dorsal spot black. Abdomen greyish-ochreous, segmental margins whitish. Forewings very narrow, ochreous-white, with some irregularly scattered black scales; a broad oblique black almost basal fascia, outer edge irregular; a broad oblique slightly curved black fascia from about $\frac{1}{3}$ of costa to middle of dorsum, outer edge irregular; a moderately broad oblique black bar from costa about $\frac{2}{3}$, lower extremity almost circularly excavated or annular; a broad irregular black subterminal fascia, enclosing a white costal mark, and confluent with a black spot on middle of termen; a terminal series of black dots: cilia whitish, with two interrupted grey lines. Hindwings grey; cilia grey-whitish, with two cloudy grey lines.

1 specimen, Molokai, at 3500 feet, in June.

(10) *Scoparia antimacha*, sp. nov.

♀. 17 mm. Head and thorax white mixed with black. Palpi black, base and tips white. Abdomen ochreous-grey, segmental margins whitish-tinged. Forewings ochreous-white, irregularly sprinkled with black; basal area much mixed and suffused with black up to first line; a moderate oblique black fascia from $\frac{1}{3}$ of costa to middle of dorsum, posterior edge broadly dilated from near costa to below middle; a black dorsal spot beyond this; a broad oblique black bar from costa before $\frac{2}{3}$, reaching half across wing, lower extremity annular, connected beneath with following fascia; a broad irregular black subterminal fascia, enclosing a white costal dot, anterior edge with long acute triangular projection below middle, posteriorly confluent with a black spot in middle of termen; a terminal series of black dots: cilia white, with much interrupted blackish antemedian line, tips round apex spotted with grey. Hindwings grey, terminally darker-suffused; cilia grey-whitish, with grey basal line.

1 specimen, Lahaina, Maui, at 2000 feet, in December.

(11) *Scoparia tyraula*, sp. nov.

♀. 14—16 mm. Head whitish-yellow, with black spots before antennae, sometimes almost confluent. Palpi black, base and tips yellow-whitish. Thorax whitish-yellow, a spot on shoulder and Λ-shaped dorsal mark black. Abdomen grey. Forewings pale ochreous-yellowish; a rather broad oblique black almost basal fascia, followed by undefined black subcostal, median, and subdorsal spots; a narrow oblique black fascia from before $\frac{1}{3}$ of costa to before middle of dorsum, posteriorly confluent with a quadrate black blotch extending from near costa to below middle; some black irroration towards middle of costa; a thick oblique black bar from before $\frac{2}{3}$ of costa, reaching half across wing, lower extremity annular, sometimes connected with preceding blotch; a small black dorsal spot beyond middle; a black costal strigula at $\frac{3}{4}$, sometimes connected beneath with preceding bar; a broad irregular black subterminal fascia, abruptly contracted below middle, anterior edge with acute triangular projection below middle: cilia whitish, more or less barred with grey, with interrupted blackish antemedian line. Hindwings grey, darker terminally; cilia grey-whitish, with grey basal line. (Plate VII. fig. 7.)

5 specimens; 3 Kaholuamano, Kauai, at 4000 feet; 2 Mts. Waimea, Kauai, at 4000 feet; from April to June.

(12) *Scoparia pentaspila*, sp. nov.

♂♀. 16—17 mm. (Head and thorax defaced.) Palpi black, base and tips white. Abdomen pale greyish-ochreous, segmental margins whitish. Forewings ochreous-white, with a few scattered black scales; a broad oblique black almost basal fascia, followed by black subcostal, median, and subdorsal marks; a moderate oblique black fascia from $\frac{1}{3}$ of costa to middle of dorsum, narrow on dorsal third, posteriorly dilated from near costa to below middle to form a quadrate black blotch, connected in middle with following bar; a broad oblique black bar from costa before $\frac{2}{3}$, reaching half across wing, lower extremity excavated, connected beneath with an inwardly oblique black mark from costa at $\frac{3}{4}$, and with following fascia; a broad irregular black subterminal fascia, on upper half very broad and nearly reaching termen, abruptly and narrowly contracted below this and again dilated downwards; a terminal series of black dots partially absorbed in this: cilia white, with two much interrupted lines becoming obsolete dorsally, first blackish, second dark grey. Hindwings light grey, terminally suffused with darker grey; cilia grey-whitish, with two cloudy grey lines.

2 specimens, Kaala Mts., Oahu, at 2000 feet, in March.

(13) *Scoparia pachysema* Meyr.

Xeroscopa pachysema Meyr. Trans. Ent. Soc. Lond. 1888, p. 236.

No specimen of this species was obtained by Mr Perkins; the locality of the original type is not recorded, but I should be disposed to conjecture Haleakala, Maui. It is a peculiar species, not very near any other, markedly narrower-winged than most others, with the black markings largely developed. The narrowed wings and dark colouring are somewhat characteristic of Haleakala species, and many of Mr Blackburn's other insects are from that locality.

(14) *Scoparia thalamias*, sp. nov.

♂. 18—21 mm. Head blackish, somewhat white-sprinkled, face mostly suffused with white. Palpi blackish, base white. Thorax blackish, variably mixed or much suffused with white dorsally, patagia margined with white, tips grey. Abdomen greyish-ochreous, segmental margins sometimes whitish. Forewings white, irregularly irrorated with black; basal area irregularly suffused with black; first line white, rather curved, oblique, sharply indented in middle, followed by some black suffusion; orbicular and claviform confluent into an irregular blackish blotch, preceded by a clearer white spot; discal 8-shaped, well-defined, black, halves filled with white, connected above with costa, beneath confluent with a very broad blackish terminal fascia, containing white costal and dorsal marks, and irregular interrupted subterminal series of white dots; an interrupted white terminal line: cilia white, barred with dark fuscous, with interrupted blackish antemedian line. Hindwings grey, terminally darker-suffused; cilia whitish, with dark grey subbasal line. (Plate VII. fig. 8.)

7 specimens; 4 Mts. Waimea, Kauai, at 4000 feet; 3 Kaholuamano, Kauai, at 4000 feet; from April to June.

(15) *Scoparia loxocentra*, sp. nov.

♀. 17—21 mm. Head white. Palpi white, with black median bar. Thorax white, a spot on shoulders and two dorsal marks black. Abdomen white, sometimes light ochreous towards base of segments. Forewings ochreous-white, with a very few scattered black scales; a rather narrow oblique black almost basal fascia, posterior edge with acute median and dorsal projections; a narrow irregular oblique black fascia from about $\frac{1}{4}$ of costa to before middle of dorsum, almost interrupted (reduced to a very fine line) below middle; orbicular and claviform small, round, black, orbicular obliquely beyond claviform, remote from preceding fascia, claviform near or in one specimen confluent with lower portion of preceding fascia; a rather narrow irregular oblique black bar from $\frac{2}{3}$ of costa, sometimes almost obsolete on costa, reaching half across wing, lower extremity excavated; a rhomboidal black praetornal spot, broadest above, preceded by a black dorsal dot; an inwardly oblique oblong black anteapical spot, preceded by a black costal dot; an undefined triangular blackish spot in middle of termen; a terminal series of black dots: cilia white. Hindwings grey-whitish, terminally suffused with grey, more strongly towards apex; an obscure grey discal mark; cilia white, round apex with faint grey line. (Plate VII. fig. 9.)

3 specimens; 1 Kona, Hawaii, at 2000 feet; 1 Kilauea, Hawaii; 1 Hualalai, Hawaii, at 8000 feet; from July to September.

(16) *Scoparia halirrhoa*, sp. nov.

♂♀. 15—16 mm. Head ochreous-white, face black-sprinkled, antennal orbits black. Palpi black, base and tips white. Thorax ochreous-white, irregularly irrorated with black. Abdomen fuscous or pale grey, segmental margins white. Forewings ochreous-white, sprinkled with black; a narrow angulated black almost basal fascia, followed by some black irroration; a narrow irregular oblique black fascia from $\frac{1}{4}$ of costa to before middle of dorsum, almost interrupted below middle; orbicular and claviform small, black, orbicular obliquely beyond claviform, widely remote from preceding fascia, claviform not touching fascia; discal 8-shaped, black, more or less connected with costa, halves filled with white or in one specimen upper half wholly black; an irregular rhomboidal black praetornal spot, broadest above, preceded by a black dorsal dot; two inwardly oblique black marks from costa before apex, connected together beneath and with a triangular black spot on middle of termen; a terminal series of black partially confluent dots: cilia ochreous-white, with two interrupted blackish lines. Hindwings whitish-grey, posteriorly suffused with grey; cilia grey-whitish, with a grey line.

3 specimens; 2 Olaa, Hawaii; 1 Hilo, Hawaii, at 2000 feet; in January and June.

(17) *Scoparia actias*, sp. nov.

♂♀. 16—17 mm. Head white. Palpi black, base and tips, and apex of second joint white. Thorax white, a spot on shoulders and a ʌ-shaped dorsal mark black. Abdomen brownish-ochreous, segmental margins white. Forewings white, with some scattered black scales; a moderate irregular-edged oblique black almost basal fascia; a narrow irregular oblique black fascia from $\frac{1}{3}$ of costa to middle of dorsum, sharply attenuated in middle, sometimes expanded posteriorly on dorsum with black suffusion; orbicular and claviform small, round, black, transversely placed, separate or confluent, sometimes connected separately with preceding fascia; discal 8-shaped, black-outlined, lower half incomplete, upper touching a small black costal spot; a rhomboidal black praetornal spot, broadest above, anterior edge sharply indented; an inwardly oblique oblong black anteapical spot, preceded by a small black costal mark, and connected beneath with a triangular black spot on middle of termen; a terminal series of black dots: cilia white, with a thick blackish interrupted antemedian line, tips obscurely spotted with blackish. Hindwings whitish-grey, posteriorly suffused with darker grey, with obscure pale posterior line; a grey discal mark; cilia whitish, with a grey line. (Plate VII. fig. 10.)

4 specimens; 3 Olaa, Hawaii, at 2000 feet; 1 Kona, Hawaii, at 2000 feet; in July, September, and November.

(18) *Scoparia melanocephala*, sp. nov.

♂. 17 mm. Head black, centre of face and sides of crown white. Palpi black, base and tips white. Thorax white mixed with black, anteriorly broadly black. Abdomen brownish-ochreous, segmental margins white. Forewings ochreous-white, with some scattered black scales; a moderate oblique black almost basal fascia, posterior edge with median and dorsal projections, followed by some black irroration; a rather narrow oblique black fascia from beyond $\frac{1}{4}$ of costa to before middle of dorsum, almost interrupted (reduced to a fine line) towards middle; orbicular and claviform confluent into an 8-shaped transverse black spot, connected above and below middle with preceding fascia, and in middle with postmedian bar; a broad oblique black bar from costa at $\frac{3}{5}$, reaching half across wing, lower extremity excavated; a rhomboidal black praetornal spot, broadest above; an inwardly oblique black mark from costa at $\frac{4}{5}$, reaching nearly half across wing; a rhomboidal black apical blotch, containing an oblique white mark not reaching apex; two black dots on lower part of termen: cilia white, with an interrupted black subbasal line, and tips spotted with dark grey round apex. Hindwings whitish-grey, terminally suffused with grey; cilia whitish, with a dark grey line becoming obsolete towards tornus.

1 specimen, Kona, Hawaii, at 4000 feet, in September.

(19) *Scoparia formosa* Butl.

Scoparia jucunda, var. *formosa* Butl. Ann. Mag. Nat. Hist. 1881, p. 331.
Xeroscopa formosa Meyr. Trans. Ent. Soc. Lond. 1888, p. 237.

♂♀. 17—18 mm. Head white. Palpi black, base and tips white. Thorax white, a spot on shoulders and ʌ-shaped dorsal mark black. Abdomen ochreous, segmental margins broadly white. Forewings white or ochreous-white; a moderate black almost basal oblique fascia, posteriorly with sharp median and longer dorsal projections, on costa generally followed by some black scales; a narrow oblique black fascia from before $\frac{1}{3}$ of costa to middle of dorsum; orbicular and claviform confluent into an irregular pentagonal black spot, anteriorly wholly confluent with preceding fascia, posterior angle shortly produced to coalesce with postmedian bar; a thick oblique black bar from costa before $\frac{2}{3}$, reaching half across wing, lower extremity excavated; a rhomboidal black praetornal spot, broadest above, preceded by a black dorsal dot; a rhomboidal black apical blotch, preceded by a black costal dot, and containing an oblique white apical mark; usually one or two black terminal dots below this: cilia white. Hindwings whitish-grey, terminally suffused with grey; cilia whitish, with a faint greyish line.

2 specimens, Haleakala, Maui, at 5000 feet, in May. Two others previously sent by Mr Blackburn from the same locality, at about 4000 feet.

(20) *Scoparia struthias*, sp. nov.

♂. 15—16 mm. Head white. Palpi black, base and tips white. Thorax white, a spot on shoulders and ʌ-shaped dorsal mark black. Abdomen light ochreous, segmental margins white. Forewings white; a thick black almost basal oblique fascia, posteriorly with sharp median and longer dorsal projections; a narrow oblique black fascia from beyond $\frac{1}{3}$ of costa to beyond middle of dorsum, anterior edge with triangular central prominence, posterior with a quadrate upwards-oblique median projection, its posterior angle shortly produced to coalesce with postmedian bar; a thick oblique black bar from costa before $\frac{2}{3}$, reaching half across wing, lower extremity almost circularly excavated; a rhomboidal black praetornal spot, broadest above, upper posterior angle sometimes connected with apical blotch; a rhomboidal black apical blotch, preceded by a black costal dot, and containing an oblique white apical mark: cilia white. Hindwings grey-whitish; a grey discal mark, and terminal suffusion; cilia white. (Plate VII. fig. 11.)

2 specimens, Mts. Waimea, Kauai, at 3000—4000 feet, in May.

(21) *Scoparia triacma*, sp. nov.

♂♀. 14—17 mm. Head white. Palpi black, base and tips white. Thorax white, a spot on shoulders and ∧-shaped dorsal mark black. Abdomen ochreous-whitish or light ochreous. Forewings white; a moderate black oblique almost basal fascia, posterior edge with sharp median and dorsal projections; a narrow oblique black fascia from $\frac{1}{3}$ of costa to middle of dorsum, anterior edge somewhat concave, generally more or less prominent in middle, posterior edge with strong usually three-lobed or three-pointed median projection, lowest point seldom obsolete; a variable oblique black bar from costa about $\frac{2}{3}$, reaching half across wing, lower extremity excavated; a rhomboidal black praetornal spot, broadest above, sometimes preceded by a black dorsal dot; an inwardly oblique oblong black anteapical spot, sometimes preceded by a black costal dot, and tending to be connected beneath with a triangular black spot on middle of termen: cilia white. Hindwings grey-whitish, terminally suffused with grey; cilia white, sometimes with a faint grey line. (Plate VII. fig. 12.)

17 specimens; 6 Mts. Waimea, Kauai, at 4000 feet; 11 Kaholuamano, Kauai, at 4000 feet; from April to June.

(22) *Scoparia jucunda* Butl.

Scoparia jucunda Butl. Ann. Mag. Nat. Hist. (5) VII. 1881, p. 331.
Xeroscopa jucunda Meyr. Trans. Ent. Soc. Lond. 1888, p. 238.

♂♀. 14—17 mm. Head white. Palpi black, base and tips white. Thorax white, a spot on shoulders and central dorsal spot black. Abdomen ochreous, segmental margins whitish. Forewings white or ochreous-white, with a few scattered black scales; a moderate oblique black almost basal fascia, posterior edge with acute median and dorsal projections; a narrow irregular oblique black fascia from before $\frac{1}{3}$ of costa to about middle of dorsum; an irregularly 8-shaped transverse black mark (representing orbicular and claviform) close beyond this, often more or less connected with it above and below middle; a moderate or narrow irregular oblique black bar from costa before $\frac{2}{3}$, reaching half across wing, lower extremity excavated; a rhomboidal black praetornal spot, broadest above, preceded by a black dorsal dot; an inwardly oblique oblong black anteapical spot, preceded by a black costal dot, tending to be connected beneath with a triangular black spot on middle of termen; a terminal series of black dots: cilia white. Hindwings whitish-grey, terminally suffused with grey, sometimes with faint pale darker-edged posterior line; cilia whitish, with more or less marked grey line.

9 specimens; 8 Kona, Hawaii, at 2000—5000 feet; 1 Lanai, at 2000 feet; in February, and from June to September.

(23) *Scoparia cryerodes*, sp. nov.

♂♀. 13—17 mm. Head white, with black spot before antennae. Palpi black, base and apex white. Thorax white, a spot on shoulders and Λ-shaped dorsal mark black, in ♀ more mixed with black. Abdomen grey, segmental margins whitish. Forewings white, with some scattered black scales, in ♀ irregularly irrorated with black; a moderate oblique black almost basal fascia, posterior edge with acute median and dorsal projections; a narrow irregular curved oblique black fascia from before $\frac{1}{3}$ of costa to middle of dorsum; an irregularly 8-shaped transverse black mark (representing orbicular and claviform) close beyond this, connected with it above and below middle, and connected in middle with postmedian bar; a moderate oblique black bar from costa before $\frac{2}{3}$, reaching half across wing, lower extremity excavated or in ♀ annular; a rhomboidal black praetornal spot, broadest above, posterior edge indented, in ♀ slenderly connected above with apical blotch; a rhomboidal black apical blotch, preceded by a black costal dot (in ♀ extended to indicate margin of second line on upper half), and including an oblique white apical mark; a terminal series of black dots partially absorbed in this: cilia white, in ♀ with blackish interrupted subbasal line. Hindwings in ♂ pale grey, in ♀ grey, terminally darker-suffused; cilia pale grey, in ♀ with darker basal line. (Plate VII. fig. 13.)

53 specimens; 24 Mts. Waimea, Kauai, at 4000 feet; 29 Kaholuamano, Kauai, at 4000 feet; from April to June. This is the only species of the genus, so far as appears, which shows a notable difference in colouring between the sexes; although this consists essentially only of an increase in the black scales of the ♀, the result is sufficiently marked and constant to allow of the sexes being mistaken for distinct species.

(24) *Scoparia crataea*, sp. nov.

♂♀. 15—20 mm. Head and thorax white, much mixed or partly suffused with black. Palpi black, base and tips white. Abdomen grey, segmental margins whitish. Forewings white, irregularly irrorated with black; a moderate oblique black almost basal fascia, outer edge with acute median and subdorsal projections, often obscured by irroration; first line clear white, edged posteriorly by a rather narrow curved oblique black fascia from before $\frac{1}{3}$ of costa to middle of dorsum; a rather outwardly oblique 8-shaped black spot (representing orbicular and claviform), more or less suffusedly connected with preceding fascia and with postmedian bar; a moderate oblique black bar from costa before $\frac{2}{3}$, reaching half across wing, lower extremity excavated or annular, connected beneath with apical blotch; an irregular rhomboidal black praetornal spot, broadest above; an irregular rhomboidal black apical blotch, enclosing a white costal strigula, and double white anteapical spot; a terminal series of confluent black dots, partly absorbed in this: cilia white, barred with grey, with dark grey subbasal line. Hindwings grey, suffused with darker towards termen; cilia grey-whitish, with grey basal line.

29 specimens; 23 Olaa, Hawaii, at 2000 feet; 6 Hilo, Hawaii, at 2000 feet; in January, June, July, and November.

(25) *Scoparia ombrodes* Meyr.

Xeroscopa ombrodes Meyr. Trans. Ent. Soc. Lond. 1888, p. 234.

♂♀. 13—16 mm. Head and thorax blackish mixed with whitish. Palpi blackish, base and tips whitish. Abdomen fuscous. Forewings white or ochreous-white, variably irrorated or suffusedly mixed with black; an undefined irregular oblique almost basal fascia, narrowed on costa; first line white, curved, oblique, edged posteriorly with blackish suffusion; orbicular and claviform small, round, black, separate, vertically placed; discal 8-shaped, black, connected above with costa, lower half filled with white, upper half sometimes whitish-mixed; second line white, more or less blackish-edged anteriorly, terminal area beyond this black; subterminal line white, connected with second in middle, interrupted above this; a terminal series of white dots: cilia whitish, more or less barred with fuscous, with a dark fuscous antemedian line. Hindwings in ♂ pale grey, in ♀ grey, darker terminally; cilia whitish or whitish-grey, with grey subbasal line. (Plate VII. fig. 14.)

41 specimens; 15 Kona, Hawaii, at 1500—4000 feet; 2 Olaa, Hawaii; 4 Lanai, at 2000 feet; 7 Molokai, at 3000 feet; 9 Waianae Mts., Oahu, at 1500 feet; 2 Mts. Waimea, Kauai, at 4000 feet; 1 Kaholuamano, Kauai, at 4000 feet; 1 Lihui, Kauai, at 1500 feet; from February to September. The two original specimens sent by Mr Blackburn were without note of locality.

(26) *Scoparia siderina*, sp. nov.

♂♀. 14—18 mm. Head, palpi, and thorax fuscous-grey, base of palpi white. Abdomen fuscous. Forewings rather dark shining ashy-grey; a slender blackish subbasal fascia; an irregular transverse blackish blotch on costa before middle, reaching half across wing, connected with dorsum by an undefined blackish line; traces of a very undefined postmedian band of fuscous suffusion; a small undefined blackish spot on costa at $\frac{3}{4}$, sometimes preceded and followed by dots of ochreous-white suffusion: cilia ashy-grey. Hindwings grey, darker terminally; cilia grey. (Plate VII. fig. 15.)

12 specimens; 7 Mts. Waimea, Kauai, at 4000 feet; 4 Kaholuamano, Kauai, at 4000 feet; 1 Haleakala, Maui, at 5000 feet; from April to June, and in October.

(27) *Scoparia parachlora*, sp. nov.

♀. 13—15 mm. Head, palpi, and thorax dark fuscous, mixed with pale yellowish, base of palpi yellow-whitish. Abdomen grey. Forewings dark fuscous, much mixed with pale ochreous-yellowish; a narrow interrupted blackish subbasal fascia, and a blackish spot in disc beyond this; first line oblique, pale yellowish, edged posteriorly on upper ⅗ by an oblong blackish blotch from costa, its lower angle including claviform; orbicular small, blackish, obliquely beyond this, separate; discal 8-shaped, blackish-outlined on sides of upper half, otherwise little defined; second and subterminal lines pale yellowish, little defined, confluent in middle; a terminal series of cloudy blackish dots: cilia grey, basal half dark grey, obscurely barred with yellow-whitish. Hindwings grey, darker posteriorly; cilia light grey, with darker subbasal line. (Plate VII. fig. 16.)

4 specimens, Olaa, Hawaii, at 2000 feet, in June, July, and November.

(28) *Scoparia ianthes*, sp. nov.

♂♀. 15—17 mm. Head orange, antennal orbits black. Palpi dark fuscous, mixed with yellowish. Thorax orange, irrorated with blackish, with whitish central patch. Abdomen whitish to light greyish-ochreous. Forewings orange, irrorated with dark fuscous or blackish; two white basal dots; first line white, oblique, irregular, rather remotely preceded by a less marked similar line; orbicular sometimes represented by a white dot; an irregular angular white median spot beyond this, one angle sometimes touching it; a smaller white spot beneath median; upper half of discal spot represented by a white dot surrounded by blackish suffusion (sometimes obsolete), lower half by a longitudinal white mark; a white costal mark about ⅔; second line white, sometimes interrupted; subterminal white, irregular, more or less interrupted in middle, beneath this nearly approaching second line: cilia ochreous-whitish, with two interrupted fuscous lines. Hindwings grey-whitish, posteriorly greyer except on a whitish posterior line; cilia white or ochreous-whitish. (Plate VII. fig. 17.)

4 specimens; 2 Mts. Waimea, Kauai, at 4000 feet; 2 Kaholuamano, Kauai, at 4000 feet; from April to June.

(29) *Scoparia marmarias*, sp. nov.

♂♀. 17—20 mm. Head orange, more or less mixed with blackish, with a white line between eyes and antennae. Palpi dark fuscous mixed with yellowish. Thorax orange, mixed with black and spotted with white. Abdomen silvery-white. Forewings ferruginous-orange, mixed with black or dark fuscous, sometimes more or less mixed irregularly with silvery-white; first line silvery-white, oblique, rather irregular; orbicular and claviform undefined, blackish, preceded and followed by silvery-white spots, orbicular rather obliquely beyond claviform; discal represented by an undefined subquadrate spot of blackish suffusion; a silvery-whitish costal suffusion beyond this; second line silvery-white, much interrupted and in disc reduced to dots; subterminal silvery-white, irregular, interrupted above middle and sometimes partially reduced to dots: cilia fuscous, barred with silvery-white, with an interrupted dark fuscous antemedian line. Hindwings shining fuscous-whitish, posteriorly greyish-tinged; cilia white.

9 specimens; 8 Olaa, Hawaii; 1 Hilo, Hawaii, at 2000 feet; in June, September, November, and December.

(30) *Scoparia aeolias*, sp. nov.

♂. 17 mm. Head ferruginous, with blackish spot before antennae and central dot on crown. Palpi ferruginous, somewhat mixed with dark fuscous. Thorax ferruginous, mixed with whitish and black. Abdomen pale ochreous, segmental margins whitish. Forewings ferruginous, irrorated with black; first line slender, irregular, oblique, silvery-white, preceded by a less marked similar line; orbicular and claviform roundish, black, separate, preceded and followed by irregular silvery-white spots, orbicular obliquely beyond claviform; discal undefined, 8-shaped, mostly suffused with black, with a white dot in lower half; median area mixed with silvery-white suffusion towards dorsum; a silvery-white costal spot about $\frac{2}{3}$; second and subterminal lines silvery-white, confluent in middle, somewhat interrupted: cilia white, barred with fuscous (imperfect). Hindwings whitish-grey, terminally grey-suffused; cilia white.

1 specimen, in only moderate condition, Oahu, at 2000 feet, in April.

(31) *Scoparia nectarias*, sp. nov.

♀. 16—19 mm. Head pale ochreous-yellowish, sprinkled with dark fuscous. Palpi pale yellowish, mixed with dark fuscous. Thorax yellow-whitish, patagia pale yellowish mixed with dark fuscous. Abdomen grey or pale grey, segmental margins white. Forewings light ochreous-yellow, closely irrorated with dark fuscous; first line white, very oblique, indented in middle, rather remotely preceded by a little-defined similar line; orbicular and claviform blackish, dot-like, claviform touching first line beneath, preceded and followed by small white spots, orbicular obliquely beyond claviform, sometimes whitish-centred or preceded by a white dot, separated from discal by a white spot; discal spot represented by two white dots connected by a blackish suffusion; second and subterminal lines well-marked, white, more or less confluent in middle: cilia white, somewhat mixed with fuscous towards tips, with a blackish or dark yellowish-fuscous antemedian line. Hindwings pale grey, becoming darker posteriorly, sometimes with faint whitish posterior line; cilia whitish-grey or whitish, with more or less marked dark grey subbasal line. (Plate VII. fig. 18.)

5 specimens; 4 Hilo, Hawaii, at 2000 feet; 1 Lanai, at 2000 feet; in January.

(32) *Scoparia bucolica*, sp. nov.

♂. 17—20 mm. Head and thorax yellowish-fuscous, somewhat whitish-sprinkled. Palpi dark fuscous, base and tips whitish. Abdomen fuscous, mixed or suffused with whitish. Forewings yellowish-fuscous, irrorated with whitish, sometimes much suffused with ochreous-yellowish, more or less sprinkled with black, veins posteriorly sometimes marked with black lines; basal area with irregular median blackish streak, and two blackish dashes towards dorsum; first line somewhat curved, oblique, whitish, posteriorly strongly edged with black suffusion; claviform moderate, roundish, black, confluent with this suffusion; orbicular annular, partly outlined with black, connected with discal by a streak or spot of whitish suffusion; discal 8-shaped, little defined, towards middle much suffused with black; second line whitish, well-defined, nearer termen than usual; subterminal cloudy, whitish, confluent with second in middle, sometimes obsolete; a terminal series of cloudy blackish marks: cilia whitish, mixed with fuscous, with darker fuscous antemedian line. Hindwings whitish-grey, terminally grey-suffused; cilia whitish, with grey subbasal line.

3 specimens, Molokai, at 4000—4500 feet, from June to August.

(33) *Scoparia pyrseutis*, sp. nov.

♀. 16—19 mm. Head and thorax whitish, more or less mixed or irrorated with dark fuscous. Palpi fuscous, base and tips whitish. Abdomen fuscous, segmental margins whitish-suffused. Forewings whitish, finely sprinkled with fuscous and blackish, sometimes partly tinged with ochreous-yellow suffusion; first line rather strongly oblique, straight, white, rather remotely preceded by a similar fainter line, and posteriorly edged with darker suffusion; a short black mark beyond this above middle; claviform elongate, black, touching posterior margin of first line; orbicular small, black, somewhat transverse, obliquely beyond claviform, separated from discal by a whitish spot; discal 8-shaped, little defined, lower half whitish, upper half laterally edged with black; second line white, tolerably defined; subterminal cloudy, whitish, ill-defined, approximated to second in middle; a terminal series of dark fuscous or blackish dots: cilia whitish, faintly barred with fuscous, with two interrupted or little marked dark fuscous lines. Hindwings whitish, terminally grey-suffused; cilia white.

2 specimens, Kona, Hawaii, at 3000—6000 feet, in August and October.

(34) *Scoparia erebochalca*, sp. nov.

♂♀. 15—16 mm. Head and thorax shining coppery, sometimes purplish-tinged. Palpi coppery-fuscous, base white. Abdomen ochreous-grey. Forewings shining ferruginous-coppery, irrorated with dark fuscous, sometimes purple-shining, sprinkled with whitish; no defined markings, but second and subterminal lines sometimes indicated with white scales: cilia light coppery-fuscous, somewhat whitish-sprinkled, sometimes whitish-barred and with dark fuscous subbasal line. Hindwings pale grey, coppery-tinged, terminally grey-suffused; cilia whitish, with grey subbasal line.

9 specimens; 7 Hilo, Hawaii, at 2000 feet; 2 Kilauea, Hawaii; in August and December.

(35) *Scoparia oenopis*, sp. nov.

♂♀. 18—23 mm. Head dark fuscous, sometimes ochreous-tinged, with a white line between eyes and antennae. Palpi dark fuscous, base white. Thorax dark coppery-fuscous, sprinkled or spotted with white. Abdomen grey or whitish-grey. Forewings dark orange-fuscous, more or less sprinkled irregularly with silvery-white; first line slender, oblique, silvery-white; orbicular, claviform, and discal spot sometimes indicated by darker suffusion, orbicular rather obliquely beyond claviform, claviform touching first line; a median band of silvery-white irroration; a costal spot of white suffusion at $\frac{2}{3}$; second line silvery-white, more or less interrupted and undefined; subterminal silvery-white, irregular, undefined; a terminal series of white dots: cilia fuscous, barred with white, with dark fuscous antemedian line. Hindwings light fuscous or whitish-fuscous, darker terminally; cilia whitish, with a fuscous line. (Plate VII. fig. 19.)

6 specimens; 3 Haleakala, Maui, at 5000 feet; 2 Hilo, Hawaii, at 2000 feet; 1 Molokai, at 3000 feet; in April, May, June, and December.

(36) *Scoparia nyctombra*, sp. nov.

♀. 17—18 mm. Head dark fuscous, ferruginous-tinged. Palpi rather dark fuscous, ferruginous-tinged, base whitish. Thorax dark fuscous, somewhat sprinkled with ferruginous and whitish. Abdomen rather dark fuscous. Forewings ferruginous-orange, much mixed with dark fuscous; irregularly scattered groups of white scales, indicating first, second, and subterminal lines, and some markings in disc, but all undefined: cilia fuscous, basal fourth dark fuscous spotted with white, tips spotted with whitish. Hindwings rather dark fuscous, darker terminally; cilia fuscous, with a darker basal line.

2 specimens, Molokai, at 4500 feet, in September.

(37) *Scoparia clonodes*, sp. nov.

♂♀. 18—23 mm. Head dark fuscous, with a white line above eyes. Palpi dark fuscous, basal joint white. Thorax dark fuscous, somewhat whitish-sprinkled. Abdomen grey, segmental margins narrowly whitish. Forewings dark fuscous, irrorated with white, sometimes tinged or partially suffused with ferruginous-ochreous, veins posteriorly sometimes streaked with black; first line very obscure, pale, oblique, curved, somewhat indented in middle, preceded by a similar line, and edged posteriorly with blackish suffusion; orbicular and claviform blackish, round, separate, claviform sometimes rather large, orbicular rather obliquely beyond claviform; discal 8-shaped, blackish, filled up with ochreous, more or less connected with costa; second line pale, very obscure, anteriorly edged with blackish suffusion; space between second and subterminal lines blackish-suffused; subterminal line whitish, distinct or sometimes obscure, touching second in middle; a terminal series of white dots: cilia whitish, obscurely barred with grey, with dark fuscous antemedian line. Hindwings pale grey, slightly yellowish-tinged, suffused posteriorly with fuscous; cilia ochreous-whitish, with a grey line. (Plate VII. fig. 20.)

13 specimens, Haleakala, Maui, at 5000 feet, in May. The conspicuously marked spots distinguish this from the next species.

(38) *Scoparia thyellopis*, sp. nov.

♂♀. 15—18 mm. Head dark fuscous or black, with a white line above eyes, and a more or less marked white central line on crown. Palpi dark fuscous, basal joint white. Thorax dark fuscous or black, sprinkled with white. Abdomen light ochreous, segmental margins narrowly whitish, sometimes with ferruginous-tinged antemedian band. Forewings fuscous or brown, somewhat tinged with purplish or coppery, mixed or sometimes much suffused with dark fuscous or blackish, and sprinkled with white; first, second, and subterminal lines indicated by white irroration, usually undefined, little marked, first oblique, curved, sharply indented in middle, sometimes edged posteriorly with dark suffusion, subterminal approximated to second in middle; orbicular and claviform round, dark fuscous, separate, little marked, orbicular rather obliquely beyond claviform; discal 8-shaped, dark fuscous, usually hardly traceable or only by dark central suffusion, sometimes with whitish dot in lower half; a terminal series of white dots: cilia whitish, barred with fuscous, with dark fuscous antemedian line. Hindwings pale fuscous or grey, somewhat darker posteriorly; cilia grey-whitish, with a fuscous subbasal line.

28 specimens; 16 Kaholuamano, Kauai, at 4000 feet; 8 Mts. Waimea, Kauai, at

4000 feet; 1 Waianae Mts., Oahu; 3 Lanai, at 3000 feet; from April to July. Differs from the preceding by the smaller size, somewhat narrower forewings, the frequent presence of a distinct white central line on crown, and the indistinctness of the normal spots, which are often almost obsolete.

(39) *Scoparia melichlora*, sp. nov.

♂♀. 15—20 mm. Head pale yellowish, with a blackish spot before antennae. Palpi black, tips and apex of basal joint yellow-whitish. Thorax pale yellowish, more or less sprinkled with dark fuscous, a spot on shoulders and central dorsal spot blackish. Abdomen silvery-grey, segmental margins whitish. Forewings pale ochreous-yellow, sprinkled with black; a moderate oblique black almost basal fascia; first line pale yellow, very oblique, edged anteriorly by an irregular black line narrowly separated from edge of basal fascia, and posteriorly by a thicker black line or slender fascia; orbicular and claviform black, dot-like, claviform confluent with posterior edge of first line, orbicular obliquely beyond claviform; discal 8-shaped, black, more or less connected by suffusion with costa, upper half pale-centred or wholly black, lower half filled with pale yellowish; a small blackish mark on costa at ¾; an inwardly oblique oblong black anteapical spot, more or less connected beneath with a triangular black spot on middle of termen; a rhomboidal black praetornal spot, broadest above, posterior edge sharply indented, with a triangular black terminal mark entering the indentation: cilia whitish, with two more or less marked interrupted lines, first blackish, second cloudy grey. Hindwings whitish grey, termen grey-suffused; cilia whitish, with grey subbasal line. (Plate VII. fig. 21.)

139 specimens; 91 Hilo, Hawaii, at 2000 feet; 47 Olaa, Hawaii; 1 Kona, Hawaii, at 2000 feet; in January, June, July, September, and December.

(40) *Scoparia zophochlora*, sp. nov.

♂♀. 18—20 mm. Head yellowish-fuscous, with a dark fuscous spot before antennae. Palpi dark fuscous, somewhat mixed with pale scales. Thorax dark fuscous, mixed with pale yellowish. Abdomen fuscous, segmental margins whitish-mixed. Forewings dark fuscous, somewhat sprinkled with pale yellowish; first line very oblique, somewhat sinuate, pale ochreous-yellow, preceded by a less marked similar line; orbicular and claviform indicated by blackish suffusion, claviform touching first line beneath, orbicular obliquely beyond claviform, preceded by a more or less marked yellow whitish dot, and separated from discal by an irregular yellow-whitish spot; discal 8-shaped, blackish, lower half filled with pale ochreous-yellow; lower half of median area much suffused with pale yellowish; second and subterminal lines pale ochreous-yellow, well-marked, confluent in middle: cilia fuscous-whitish, barred with fuscous, with an interrupted dark fuscous antemedian line. Hindwings grey, darker terminally; cilia grey, more whitish basally, with a dark grey subbasal line.

2 specimens, Molokai, at 4500 feet, in June and September.

(41) *Scoparia hawaiensis* Butl.

Scoparia hawaiensis Butl. Ann. Mag. Nat. Hist. (5) VII. 1881, p. 330.
Xeroscopa hawaiensis Meyr. Trans. Ent. Soc. Lond. 1888, p. 235.

♂♀. 15—18 mm. Head ochreous-yellow on crown, sides somewhat mixed with dark fuscous, face dark fuscous, somewhat sprinkled with yellowish, with blackish spots before antennae. Palpi dark fuscous, base and tips whitish. Thorax yellow-whitish mixed with blackish. Abdomen grey or pale greyish-ochreous, segmental margins often whitish. Forewings yellow-whitish, irrorated or mixed with blackish; a moderate irregular oblique black almost basal fascia; first line yellow-whitish or pale yellow, oblique, sinuate outwards above and below middle, closely preceded by and sometimes partly confluent with a similar line, and followed by a more or less marked fascia of black suffusion; orbicular and claviform separate, black, usually suffused and little defined, vertically placed; discal 8-shaped, black, upper half wholly black or only obscurely pale-centred, lower filled with yellow-whitish; second line obscure, little marked, followed on costa and dorsum by black spots; a terminal series of black dots, confluent in middle into a triangular spot: cilia whitish, barred with grey, with an interrupted blackish antemedian line. Hindwings whitish-grey, towards termen grey-suffused; cilia whitish, with a grey line.

83 specimens; 54 Olaa, Hawaii; 26 Hilo, Hawaii, at 2000 feet; 2 Kona, Hawaii, at 2000 and 4000 feet; 1 Molokai, at 4500 feet; in January, June, July, September, November, and December. Mr Blackburn's specimens were from Mauna Kea, Hawaii, at 7000 feet. This species can always be distinguished from *S. empeda* by the distinctly yellow (sometimes almost orange) crown of the head. I am disposed to doubt the Molokai locality.

(42) *Scoparia empeda*, sp. nov.

♂♀. 17—20 mm. Head ochreous-whitish, face dark fuscous. Palpi dark fuscous, base and tips whitish. Thorax ochreous-whitish, much mixed with blackish. Abdomen fuscous, segmental margins sometimes whitish. Forewings ochreous-whitish, mixed with blackish; a nearly basal oblique undefined blackish fascia; first line strong, oblique, ochreous-whitish, preceded by a similar nearly confluent line, appearing to form together a conspicuous fascia, edged posteriorly with blackish suffusion; orbicular and claviform roundish, blackish, undefined, separate, orbicular somewhat obliquely beyond claviform; discal 8-shaped, blackish, halves filled with whitish or upper half mostly suffused with blackish; second line ochreous-whitish, well-defined; terminal area beyond it suffused with blackish, subterminal line cloudy, ochreous-whitish, confluent in middle with second, interrupted above this; a terminal series of whitish dots: cilia ochreous-whitish, more or less indistinctly barred with grey, with a dark fuscous antemedian line. Hindwings light grey, darker posteriorly; cilia grey-whitish, with grey subbasal line.

5 specimens; 3 Haleakala, Maui, at 5000 feet; 2 Lanai, at 2000 feet; in January, May, and December.

(43) *Scoparia demodes* Meyr.

Xeroscopa demodes Meyr. Trans. Ent. Soc. Lond. 1888, p. 234.

♀. 17 mm. Head and thorax fuscous, mixed with white. Palpi dark fuscous, base white, second joint somewhat mixed with white, at least at apex. Forewings white, irregularly irrorated with fuscous or ochreous-fuscous; a narrow irregular almost basal blackish fascia; first line white, oblique, curved, indented in middle, edged posteriorly with blackish suffusion, space between this and subbasal fascia appearing to form a broad whitish band; orbicular and claviform merged in the dark suffusion or obsolete; discal undefined, 8-shaped, partially blackish-edged laterally, lower half whitish-filled; second and subterminal lines white, defined or cloudy, confluent in middle; a terminal series of dark fuscous dots: cilia ochreous-whitish, indistinctly barred with fuscous, with a darker fuscous antemedian line. Hindwings pale fuscous, darker posteriorly; cilia whitish, with a grey subbasal line.

1 specimen, Mts. Waimea, Kauai, at 4000 feet, in May; in conjunction with which I have redescribed the original type, which entirely agrees with it, and may probably be from the same island, though its locality is not recorded.

(44) *Scoparia dactyliopa*, sp. nov.

♂♀. 18—21 mm. Head and thorax white mixed with dark fuscous. Palpi dark fuscous mixed with whitish, with a blackish median band, base white. Abdomen fuscous, mixed with whitish. Forewings white, irrorated with fuscous and black; an undefined narrow blackish almost basal fascia; first line white, oblique, rather curved, indented in middle, edged posteriorly with black suffusion; orbicular somewhat reniform, clear white, black-edged, touching black suffusion of first line; claviform very small, irregular, white, black-edged, touching first line; discal 8-shaped, white, black-edged except at top and bottom; second line white, obsolete except at extremities; subterminal cloudy, whitish, interrupted above middle: cilia whitish, indistinctly barred with fuscous, with an interrupted blackish antemedian line. Hindwings light fuscous, darker towards termen; cilia whitish, basal third fuscous. (Plate VII. fig. 22.)

2 specimens, Molokai, at 4500 feet, in September.

(45) *Scoparia geraea*, sp. nov.

♂♀. 12—13 mm. Head and thorax whitish, sprinkled with grey. Palpi blackish, sprinkled with whitish, base white. Abdomen grey. Forewings whitish, finely sprinkled with blackish; a spot of blackish suffusion on base of costa, and one in middle near base; first line white, curved, oblique, indented in middle, edged posteriorly with blackish irroration; orbicular small, roundish, blackish-grey, separate; claviform obsolete; discal 8-shaped, halves white, little-defined, separated by blackish-grey suffusion; second and subterminal lines white, confluent in middle, surrounded with blackish-grey irroration: cilia white, with grey antemedian line. Hindwings whitish-grey, termen suffused with grey; cilia whitish, with indistinct greyish subbasal line. (Plate VII. fig. 23.)

3 specimens; 2 Waianae Mts., Oahu, at 2000—3000 feet; 1 Mts. Waimea, Kauai, at 3000—4000 feet; in April and May. Distinct by its small size and pallid appearance.

(46) *Scoparia epimystis*, sp. nov.

♂. 19 mm. Head and thorax fuscous, mixed with whitish. Palpi dark fuscous, base and extreme tips white. Abdomen greyish-ochreous, segmental margins whitish-suffused. Forewings fuscous, irrorated with white, more suffusedly towards middle of disc; short black subcostal and median streaks from base; first line white, anteriorly suffused, acutely angulated below middle, upper portion very oblique, lower edged posteriorly with dark fuscous; orbicular small, blackish, white-centred, placed in a blackish-fuscous dash reaching first line; claviform small, blackish-fuscous, resting on first line above angle; discal 8-shaped, dark fuscous, halves obscurely filled with whitish, lower little defined; second line obscurely whitish, very undefined; subterminal obsolete; a terminal series of elongate blackish-fuscous dots: cilia whitish, with dark fuscous antemedian and fuscous subapical line. Hindwings light fuscous, termen darker-suffused; cilia whitish, basal third and subapical line fuscous.

1 specimen, Kona, Hawaii, at 4000 feet, in August.

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(47) *Scoparia frigida* Butl.

Scoparia frigida Butl. Ann. Mag. Nat. Hist. (5) VII. 1881, p. 331.

♂♀. 17—19 mm. Head and thorax dark fuscous mixed with whitish, head sometimes mostly suffused with whitish. Palpi dark fuscous, base and tips white. Abdomen fuscous. Forewings very narrow, whitish, irregularly mixed with fuscous; basal area with some dark fuscous scales tending to form longitudinal streaks; first line white, angulated below middle, upper portion straight or slightly curved, very oblique, indistinctly edged posteriorly with dark fuscous; orbicular small, irregular, partly edged with blackish-fuscous, separate or connected with first line; claviform only indicated by some blackish-fuscous scales on angle of first line; upper half of discal incompletely margined with blackish-fuscous; second and subterminal lines white, rather thick, cloudy, confluent in middle, included spaces mixed or suffused with dark fuscous; a terminal series of cloudy dark fuscous dots: cilia white, with fuscous subapical and dark fuscous antemedian lines. Hindwings rather light fuscous; cilia whitish, basal third fuscous.

4 specimens; 2 Lanai, at 3000 feet, in July; 2 Haleakala, Maui, at 5000 and 10,000 feet, in April and May. The original type is also from Haleakala, Maui, at 4000 feet; but the second specimen, from Mauna Kea, Hawaii, is *S. meristis.*

(48) *Scoparia peronetis*, sp. nov.

♀. 16 mm. Head fuscous, crown suffused with whitish. Palpi dark fuscous, base and extreme tips white. Thorax dark fuscous, somewhat whitish-mixed. Abdomen light greyish-ochreous, segmental margins whitish. Forewings whitish, irrorated with fuscous; a slender irregular blackish longitudinal line from middle of base to middle of first line, continued less distinctly along submedian fold to tornus; first line white, indistinct, angulated above middle, upper portion very oblique, indented in middle, towards dorsum followed by a dot of dark fuscous suffusion; orbicular and claviform small, blackish, undefined, claviform placed in an indentation of first line, orbicular rather obliquely beyond it; discal 8-shaped, hardly indicated except by a blackish median dash, and a mark on anterior side of upper half; second and subterminal lines obsolete; veins somewhat marked with black posteriorly, and a terminal series of elongate blackish dots: cilia whitish, obscurely barred with fuscous, with a dark fuscous antemedian line. Hindwings grey-whitish, terminally grey-suffused; cilia whitish.

1 specimen, Kona, Hawaii, at 3000 feet in October.

(49) *Scoparia ischnias* Meyr.

Xeroscopa ischnias Meyr. Trans. Ent. Soc. Lond. 1888, p. 235.

♂♀. 17—21 mm. Head and thorax dark fuscous, more or less mixed with white. Palpi dark fuscous, base and tips white. Antennae in ♂ pubescent-ciliated over whole surface. Abdomen ochreous-grey. Forewings very narrow, fuscous, irregularly irrorated with white and black; a streak of blackish suffusion along fold from base to first line, interrupted by an undefined white central dot; first line white, almost straight, rather strongly oblique, posteriorly dark-edged; orbicular and claviform dot-like, undefined, blackish, separate, orbicular obliquely beyond claviform; discal undefined, **X**-shaped, blackish, preceded by a small cloudy white spot; second and subterminal lines cloudy, white, approximated in middle, second interrupted towards dorsum: cilia white, with fuscous subapical and dark fuscous subbasal lines. Hindwings fuscous-whitish, termen suffused with light fuscous; cilia white, with light fuscous basal line. (Plate VII. fig. 24.)

5 specimens, Haleakala, Maui, at 9000—10,000 feet, in April and May. Probably the original type was from the same locality.

(50) *Scoparia melanopis* Meyr.

Scoparia coarctata var.? *montana* Butl. Trans. Ent. Soc. Lond. 1882, p. 41.
Xeroscopa melanopis Meyr. Trans. Ent. Soc. Lond. 1888, p. 233.

No examples of this species were obtained by Mr Perkins; there is one in the British Museum, and two in my collection; Mr Blackburn gives as locality the mountains near Honolulu, Oahu. Two specimens are mentioned by Butler in the reference quoted above, but one of these is, I think, a poor example of *frigida*; the other is this species, and now bears a type-label, which it did not in 1888. Considering this fact, and also that (1) Butler's name is varietal, not specific, being wrongly identified with *angustea* (*coarctata*), (2) there is practically no description accompanying it, I have therefore not used his name.

(51) *Scoparia macrophanes* Meyr.

Scoparia macrophanes Meyr. Trans. Ent. Soc. Lond. 1888, p. 231.

♀. 17—20 mm. Head, palpi, and thorax fuscous mixed with white, palpi with dark fuscous median band, base white. Abdomen grey, segmental margins whitish. Forewings very narrow, fuscous, suffusedly irrorated with white, with scattered black scales; indications of a dark subbasal fascia; first line white, moderately oblique, rather curved, indented in middle, edged posteriorly with dark fuscous suffusion; orbicular small, irregular, detached, laterally edged with dark fuscous; claviform dark fuscous, more or less merged in dark suffusion of first line; discal 8-shaped, partially outlined with blackish; second line white, distinct; subterminal cloudy, white, confluent with second in middle; a terminal series of cloudy blackish dots: cilia whitish, with dark fuscous antemedian and fuscous subapical line. Hindwings whitish-fuscous, termen suffused with fuscous; cilia as in forewings.

2 specimens, Haleakala, Maui, at 5000 feet, in May. The original type may probably be from the same locality.

(52) *Scoparia meristis*, sp. nov.

Scoparia frigida Meyr. Trans. Ent. Soc. Lond. 1888, p. 231, *non* Butl.

♂♀. 14—20 mm. Head and thorax fuscous, more or less mixed with white. Palpi dark fuscous, base and tips white. Abdomen light greyish-ochreous. Forewings suffusedly irrorated with white and sometimes sprinkled with black; sometimes a blackish median longitudinal streak in basal area; veins posteriorly sometimes streaked with blackish; first line whitish, little curved, very oblique, posteriorly narrowly edged with blackish-fuscous suffusion; orbicular small, roundish, more or less edged with blackish-fuscous, separate; claviform obsolete; discal X-shaped, blackish, often imperfectly defined; second and subterminal lines whitish, ill-defined, confluent in middle; a terminal series of suffused dark fuscous elongate dots: cilia whitish, with dark fuscous subbasal and fuscous subapical line. Hindwings pale fuscous, darker terminally; cilia whitish, with fuscous subbasal line.

31 specimens; 24 Kona, Hawaii, at 4000—6000 feet; 7 Molokai, at 3000—4000 feet; from June to September. Of the two examples referred by Butler to his *frigida*, one (from Mauna Kea, Hawaii, at 7000 ft.) is this species, but the type (as identified above) is the other; the description also clearly indicates the angulated first line characteristic of the Maui species, but in 1888 I had not recognised their distinctness.

(53) *Scoparia halmaea*, sp. nov.

♂♀. 14—20 mm. Head and thorax white, more or less mixed with fuscous and blackish. Palpi dark fuscous, base and tips white. Abdomen greyish-ochreous, segmental margins whitish-suffused. Forewings white, more or less irrorated with fuscous or dark fuscous; a dark fuscous suffusion at base of costa, sometimes extended to reach a blackish median dash; first line white, somewhat curved, very oblique, posteriorly edged with dark fuscous suffusion mixed with black; orbicular small, irregularly dot-like, blackish, sometimes connected with preceding suffusion; claviform obsolete; discal X-shaped, blackish; second and subterminal lines cloudy, whitish, confluent in middle; a terminal series of indistinct dark fuscous dots, confluent into a triangular spot in middle: cilia white, with interrupted dark fuscous antemedian and traces of fuscous subapical line. Hindwings whitish-fuscous, terminally suffused with fuscous; cilia whitish, with a fuscous subbasal line. (Plate VII. fig. 25.)

53 specimens; 12 Mts. Waimea, Kauai, at 4000 feet; 41 Kaholuamano, Kauai, at 4000 feet; from April to June. Closely allied to the preceding species, but apparently somewhat shorter-winged, with the ground colour more suffused with white, and the black scales better developed, so that the markings are more distinct, and in particular the orbicular forms a conspicuous black dot.

(54) *Scoparia platyscia*, sp. nov.

♂♀. 14—23 mm. Head and thorax dark brown, more or less mixed with whitish. Palpi dark fuscous, tips whitish-mixed, base white. Abdomen ochreous, segmental margins whitish. Forewings whitish, variably mixed with ferruginous or dark brown; an undefined dark ferruginous-brown basal suffusion; first line whitish, oblique, little curved, followed by a variable fascia of dark ferruginous-brown suffusion; claviform dot-like, blackish-fuscous, undefined, touching or merged in preceding suffusion; orbicular small, whitish, edged with dark brown or blackish, obliquely beyond claviform; discal 8-shaped, lower half undefined except at top, upper half merged in a ferruginous or dark brown bar from costa, but sometimes partially blackish-edged, seldom filled with whitish; second and subterminal lines obscure, whitish, confluent in middle, surrounded with ferruginous or dark brown suffusion: cilia whitish, obscurely barred with fuscous, with interrupted darker fuscous antemedian line. Hindwings whitish-grey, termen grey-suffused; cilia whitish, sometimes with faint greyish line. (Plate VII. fig. 26.)

34 specimens; 13 Mts. Waimea, Kauai, at 4000 feet; 4 Kaholuamano, Kauai, at 4000 feet; 4 Molokai, at 4000 feet; 3 Kona, Hawaii, at 2000—4000 feet; 8 Olaa, Hawaii; 2 Hilo, Hawaii, at 2000 feet; in December, January, and from April to October.

(55) *Scoparia probolaea*, sp. nov.

♂♀. 21—25 mm. Head and thorax white mixed with fuscous. Palpi long ($3\frac{1}{2}$—4), dark fuscous, base white, apex mixed with white. Abdomen pale greyish-ochreous or whitish-ochreous. Forewings white, irrorated with fuscous; short dark fuscous subcostal and median dashes near base, sometimes obsolete; first line cloudy, whitish, curved, very oblique, sharply indented in middle, edged posteriorly with dark fuscous suffusion mixed with black; orbicular elongate or dash-like, black, detached; claviform dot-like, blackish, touching first line and sometimes merged in dark suffusion; discal x-shaped, blackish, separated from orbicular by a clear white spot; second and subterminal lines cloudy, white, hardly defined, confluent in middle; a terminal series of cloudy blackish dots: cilia white, with two interrupted fuscous lines. Hindwings whitish-fuscous, termen fuscous-suffused; cilia whitish, with a fuscous basal line. (Plate VII. fig. 27.)

13 specimens; 8 Kaholuamano, Kauai, at 4000 feet; 5 Mts. Waimea, Kauai, at 4000 feet; from April to June.

(56) *Scoparia omichlopis*, sp. nov.

♂♀. 15—25 mm. Head and thorax whitish, suffusedly irrorated with pale brownish-ochreous, shoulders usually dark fuscous. Palpi long (3½—4), dark fuscous, base whitish, apex more or less mixed with whitish. Abdomen pale whitish-ochreous. Forewings white, finely irrorated with brownish-ochreous; a very short fine blackish subcostal dash from base, sometimes obsolete; first line whitish, almost obsolete, curved, very oblique, indented in middle, followed by a dark fuscous mark towards dorsum, and usually two or three dots of dark fuscous suffusion towards costa; a dark fuscous dot indicating orbicular, remote from first line; claviform obsolete; discal indicated by a short dark fuscous dash and two dark fuscous dots above it; second and subterminal lines very faint or obsolete; a terminal series of indistinct dark fuscous dots: cilia whitish, with an indistinct brownish-ochreous antemedian line. Hindwings whitish-fuscous; cilia whitish, with a faint fuscous subbasal line. (Plate VII. fig. 28.)

33 specimens; 8 Mts. Waimea, Kauai, at 4000 feet; 16 Kaholuamano, Kauai, at 4000 feet; 6 Olaa, Hawaii; 3 Hilo, Hawaii, at 2000 feet; in January, from April to July, September and December.

(57) *Scoparia venosa* Butl.

Scoparia venosa Butl. Ann. Mag. Nat. Hist. (5) VII. 1881, p. 332.
Xeroscopa venosa Meyr. Trans. Ent. Soc. Lond. 1888, p. 233.

♂♀. 16—22 mm. Head and thorax white, sprinkled with fuscous. Palpi dark fuscous, base and tips white. Abdomen light ochreous-grey, segmental margins whitish. Forewings very narrow, fuscous, more or less mixed with blackish; all veins marked by more or less defined white streaks; normal lines and spots hardly perceptible or wholly obsolete: cilia white with dark fuscous antemedian and fuscous subapical lines. Hindwings pale whitish-fuscous, termen somewhat darker-suffused; cilia whitish, with fuscous subbasal line.

6 specimens; 2 Kona, Hawaii, at 4000 feet; 2 Kilauea, Hawaii; 2 Haleakala, Maui, at 5000 feet; in May, July to September, November, December. Mr Blackburn's examples were from Mauna Loa, Hawaii, at 4000 feet.

PYRALIDIDAE.

PYRALIS *Linn.*

Cilia of forewings yellow ....(*1*) *mauritialis.*
,, ,, not yellow ....(*2*) *manihotalis.*

(1) *Pyralis mauritialis* Boisd.

6 specimens, Lihui, Kauai. One of these is stated to have been bred by G. C. Munro from a larva feeding in the old nest of a wasp of the genus *Polistes* (*Vespidae*). The species occurs in Australia, the Malay Archipelago, China, India, and S. Africa, but I am not aware that the larval habit has been previously noticed.

(2) *Pyralis manihotalis* Guen.

Pyralis achatina Butl. Ent. Mo. Mag. XIV. p. 49.
Asopia gerontialis Walk., Meyr. Trans. Ent. Soc. Lond. 1888, p. 212.

1 specimen, Honolulu, Oahu. Doubtless Mr Blackburn's types were from the same place. The species ranges through the tropical regions of Australia, the Malay Archipelago, S. Asia, Africa, and S. America.

DESCRIPTION OF PLATE III. (VOL. I.)

MACROLEPIDOPTERA.

ILLUSTRATING VARIATION IN COLOUR.

Fig. 1. *Leucania euclidias*, Male; 1 *a*, *Leucania euclidias*, Female; 1 *b* to 1 *h*, front wings of varieties of *Leucania euclidias*.

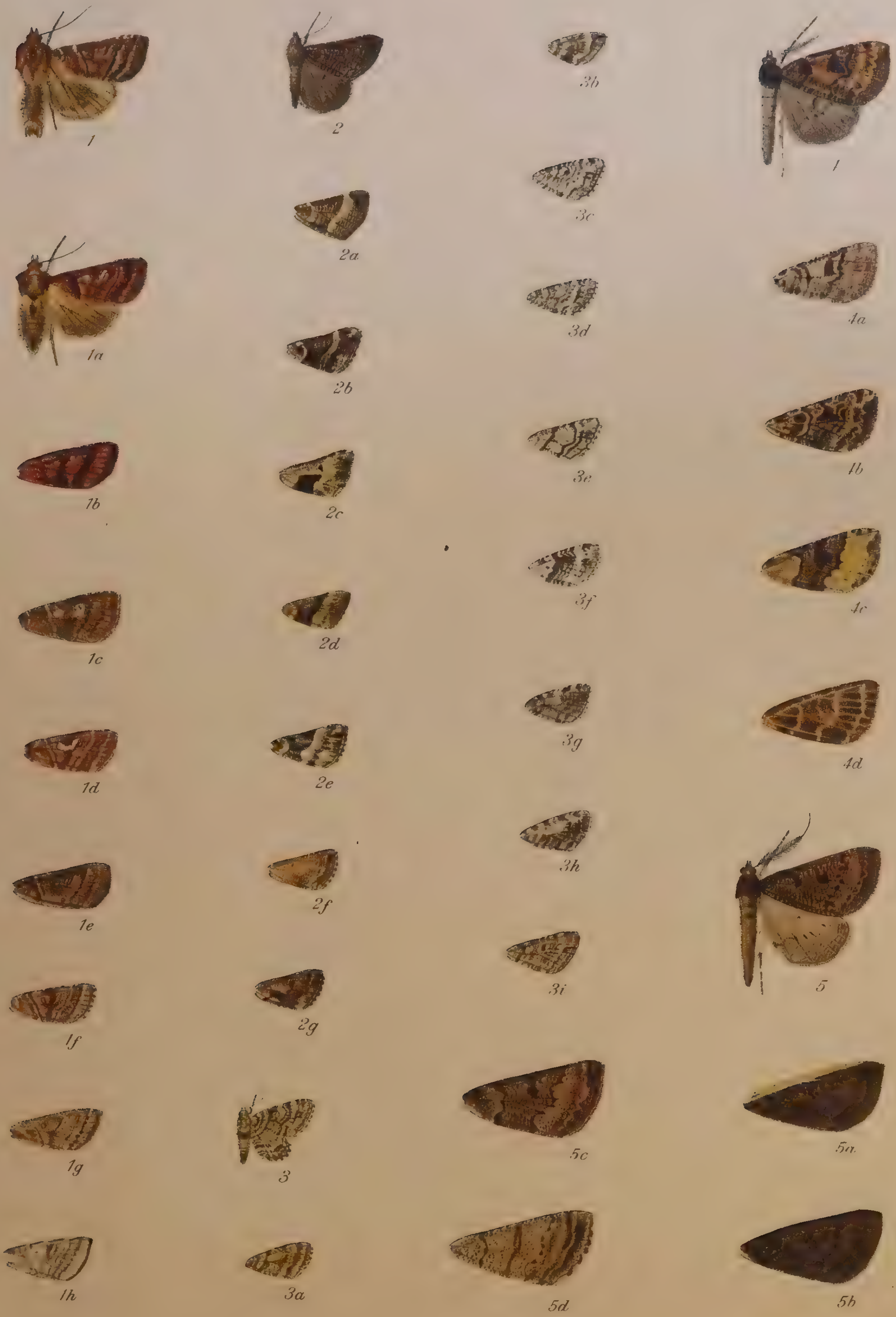
Fig. 2. *Nesamiptis obsoleta;* 2 *a* to 2 *g*, front wings of varieties of *Nesamiptis obsoleta*.

Fig. 3. *Eucymatoge monticolans;* 3 *a* to 3 *i*, front wings of varieties of *Eucymatoge monticolans*.

Fig. 4. *Scotorythra pachyspila*, Male; 4 *a* to 4 *d*, front wings of varieties of *Scotorythra pachyspila*.

Fig. 5. *Scotorythra rara*, Male; 5 *a* to 5 *d*, front wings of varieties of *Scotorythra rara*.

All natural size.



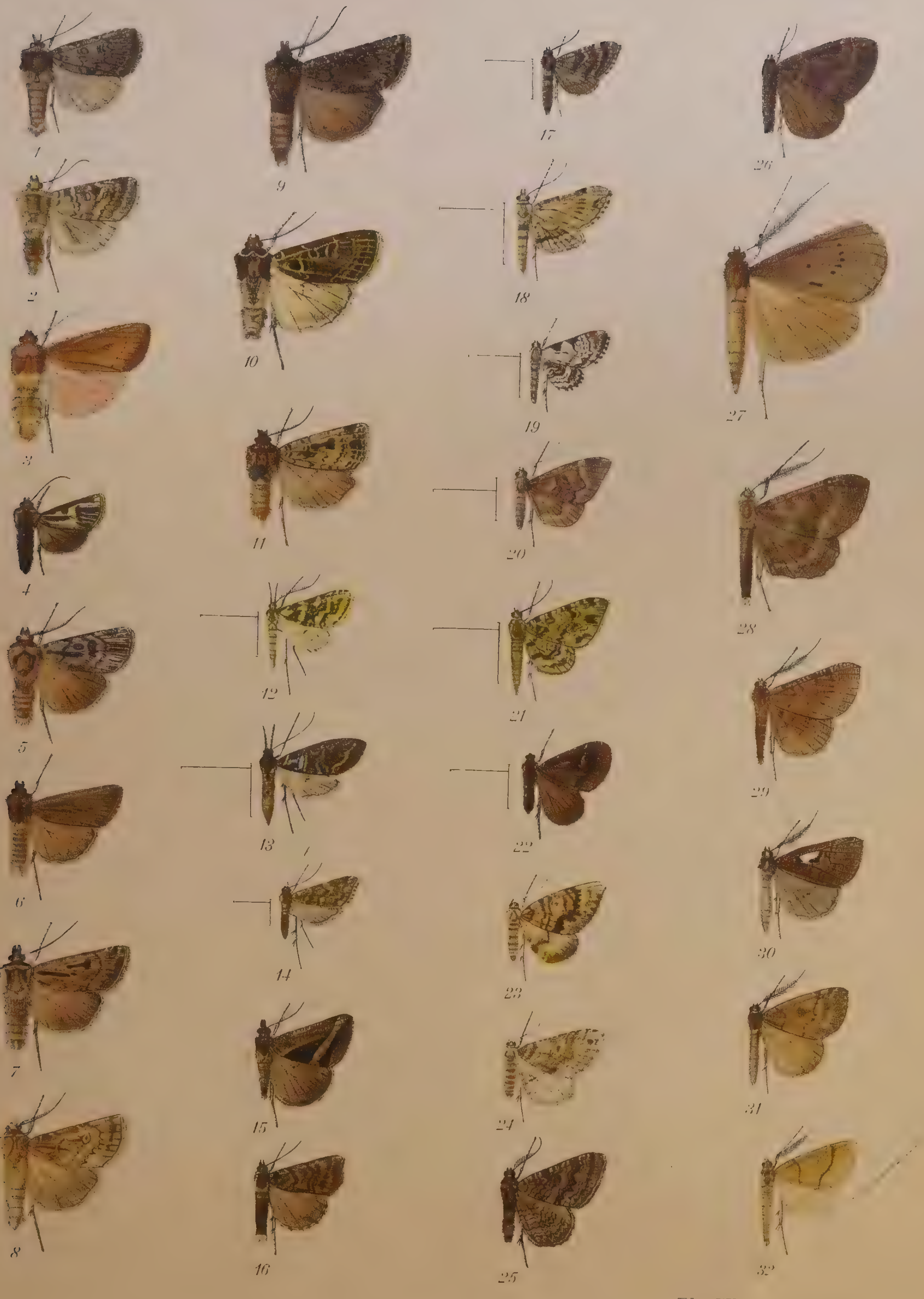
Edwin Wilson, lith. Cambridge.

Meyrick. Macrolepidoptera.

DESCRIPTION OF PLATE IV. (VOL. I.)

MACROLEPIDOPTERA.

Fig. 1. *Leucania anthracias.*
Fig. 2. *L. compsias.*
Fig. 3. *L. pyrrhias.*
Fig. 4. *Agrotis microreas.*
Fig. 5. *A. panoplias.*
Fig. 6. *A. aulacias.*
Fig. 7. *A. xiphias.*
Fig. 8. *A. spoderopa.*
Fig. 9. *A. epicremna.*
Fig. 10. *A. neurogramma.*
Fig. 11. *A. psammophaea.*
Fig. 12. *Hypenodes epichalca.*
Fig. 13. *H. cyanias.*
Fig. 14. *H. oxygramma.*
Fig. 15. *Nesamiptis plagiota.*
Fig. 16. *Cosmophila noctivolans.*
Fig. 17. *Eucymatoge scoriodes.*
Fig. 18. *E. staurophragma.*
Fig. 19. *E. niphoreas.*
Fig. 20. *E. rhodopyra.*
Fig. 21. *E. orichloris.*
Fig. 22. *Hydriomena aphoristis.*
Fig. 23. *Xanthorhoe ioxantha.*
Fig. 24. *X. leucoxyla.*
Fig. 25. *Progonostola cremnopis.*
Fig. 26. *Dasyuris holombra.*
Fig. 27. *Sisyrophyta gomphias.*
Fig. 28. *Scotorythra syngonopa.*
Fig. 29. *S. aruraea.*
Fig. 30. *S. trapezias.*
Fig. 31. *S. idolias.*
Fig. 32. *S. demetrias.*



Edwin Wilson, lith. Cambridge.

Meyrick. Macrolepidoptera.

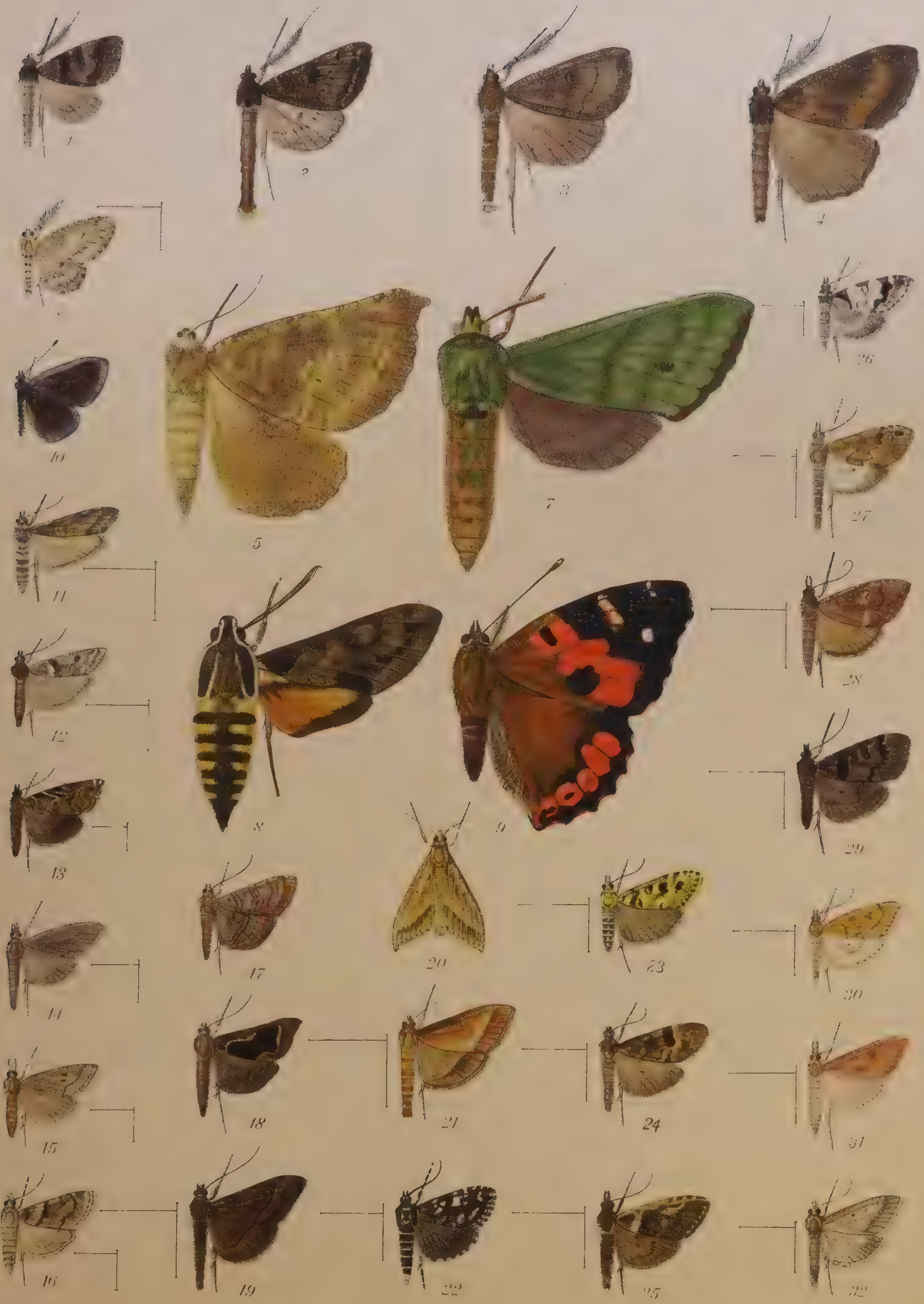
DESCRIPTION OF PLATE V. (VOL. I.)

MACROLEPIDOPTERA.

Fig. 1. *Scotorythra orthrarcha* ♂.
Fig. 2. *S. macrosoma* ♂.
Fig. 3. *S. brachytarsa* ♂.
Fig. 4. *S. euryphaea* ♂.
Fig. 5. *S. megalophylla* ♀.
Fig. 6. *Tritocleis microphylla* ♂.
Fig. 7. *Deilephila? smaragditis.* (The antennae of the unique specimen are very much damaged.)
Fig. 8. *D. pyrias.*
Fig. 9. *Vanessa tammeamea.*
Fig. 10. *Lycaena blackburni.*
Fig. 11. *Genophantis iodora.*
Fig. 12. *Homoeosoma amphibola.*
Fig. 13. *Prionopteryx exonoma.*
Fig. 14. *Talis geralea.*
Fig. 15. *T. hyacinthina.*
Fig. 16. *T. floricolans.*
Fig. 17. *Margaronia cyanomichla.*
Fig. 18. *Omiodes euryprora.*
Fig. 19. *O. iridias.*
Fig. 20. *O. telegrapha.*
Fig. 21. *O. monogramma.*
Fig. 22. *Phlyctaenia calliastra.*
Fig. 23. *P. chalcophanes.*
Fig. 24. *P. ephippias.*
Fig. 25. *P. iocrossa.*
Fig. 26. *P. eucrena.*
Fig. 27. *P. metasema.*
Fig. 28. *P. ommatias.*
Fig. 29. *P. pachygramma.*
Fig. 30. *P. liopis.*
Fig. 31. *P. pyranthes.*
Fig. 32. *P. heterodoxa.*

FAUNA HAWAIIENSIS.

VOL. I. PLATE V.



Edwin Wilson, lith. Cambridge.

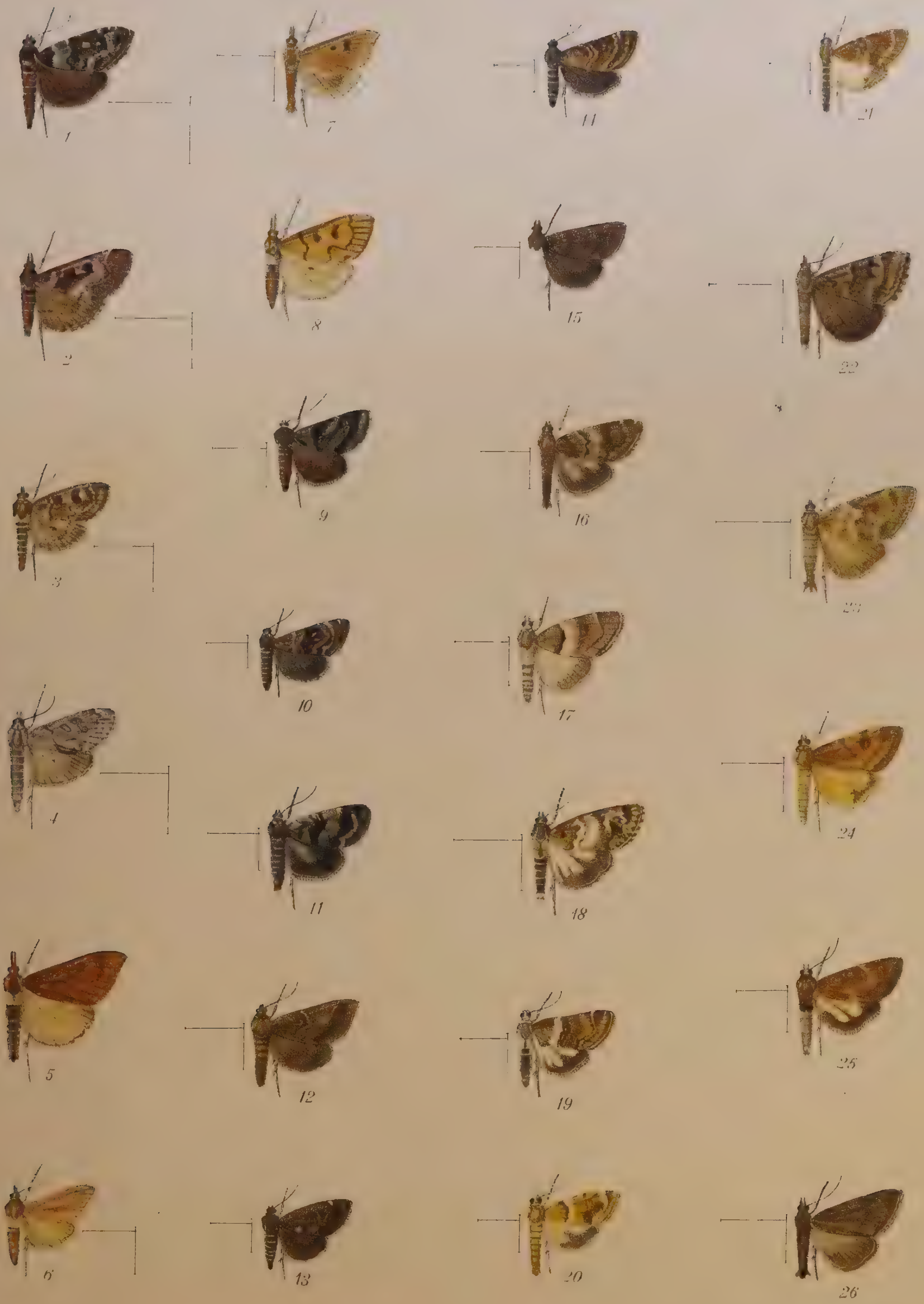
Meyrick. Macrolepidoptera.

DESCRIPTION OF PLATE VI. (VOL. I.)

MACROLEPIDOPTERA.

Fig. 1. *Pyrausta bryochloris.*
Fig. 2. *P. dracontias.*
Fig. 3. *P. thermantis.*
Fig. 4. *P. psychropa.*
Fig. 5. *P. phethontia.*
Fig. 6. *Mecyna aurora.*
Fig. 7. *Loxostege melanopis.*
Fig. 8. *L. helioxantha.*
Fig. 9. *Promylaea pyropa.*
Fig. 10. *Mestolobes amethystias.*
Fig. 11. *M. chrysomolybda.*
Fig. 12. *M. erinnys.*
Fig. 13. *M. epidelta.*
Fig. 14. *M. iochrysa.*
Fig. 15. *M. ombrias.*
Fig. 16. *M. scleropis.*
Fig. 17. *M. orthrias.*
Fig. 18. *M. pessias.*
Fig. 19. *M. mesacma.*
Fig. 20. *M. perixantha.*
Fig. 21. *M. autodoxa.*
Fig. 22. *Orthomecyna metalycia.*
Fig. 23. *O. heterodyas.*
Fig. 24. *O. chrysophanes.*
Fig. 25. *O. epicausta.*
Fig. 26. *O. picrodes.*

FAUNA HAWAIIENSIS. VOL. I. PLATE VI.



Edwin Wilson, lith. Cambridge.

Meyrick. Macrolepidoptera.

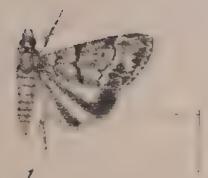
DESCRIPTION OF PLATE VII. (VOL. I.)

MACROLEPIDOPTERA.

Fig. 1. *Orthomecyna mesochasma.*
Fig. 2. *Protaulacistis cataphaea.*
Fig. 3. *Scoparia tetranesa.*
Fig. 4. *S. amphicypella.*
Fig. 5. *S. balanopis.*
Fig. 6. *S. orthoria.*
Fig. 7. *S. tyraula.*
Fig. 8. *S. thalamias.*
Fig. 9. *S. loxocentra.*
Fig. 10. *S. actias.*
Fig. 11. *S. struthias.*
Fig. 12. *S. triacna.*
Fig. 13. *S. cryerodes.*
Fig. 14. *S. ombrodes.*
Fig. 15. *S. siderina.*
Fig. 16. *S. parachlora.*
Fig. 17. *S. ianthes.*
Fig. 18. *S. nectarias.*
Fig. 19. *S. oenopis.*
Fig. 20. *S. clonodes.*
Fig. 21. *S. melichlora.*
Fig. 22. *S. dactyliopa.*
Fig. 23. *S. geraea.*
Fig. 24. *S. ischnias.*
Fig. 25. *S. halmaea.*
Fig. 26. *S. platyscia.*
Fig. 27. *S. probolaea.*
Fig. 28. *S. omichlopis.*

FAUNA HAWAIIENSIS.

VOL. I PLATE VII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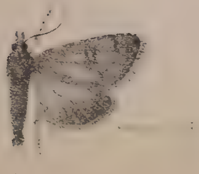
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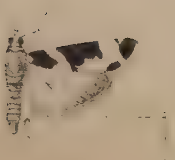
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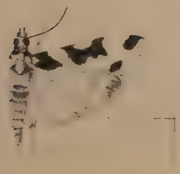
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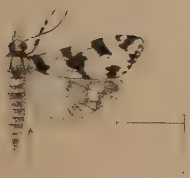
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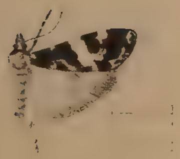
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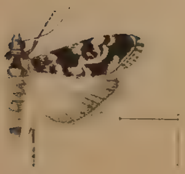
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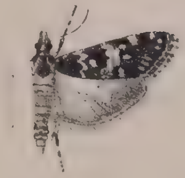
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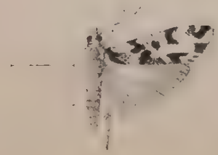
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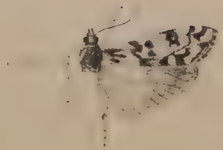
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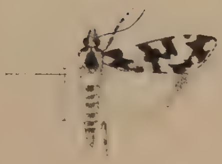
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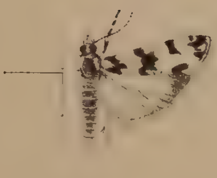
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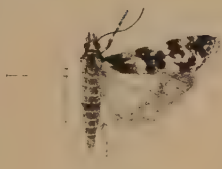
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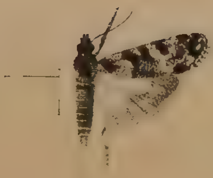
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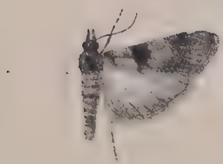
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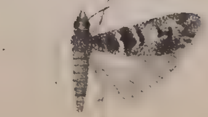
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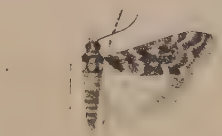
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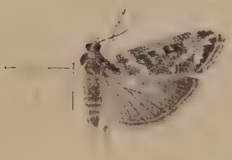
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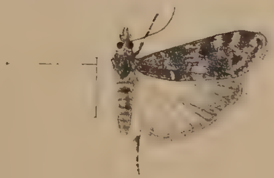
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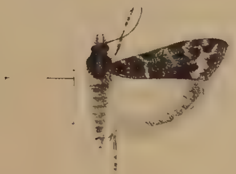
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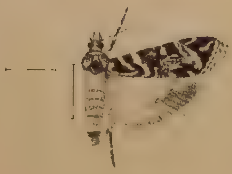
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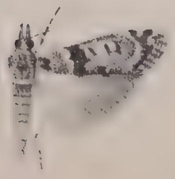
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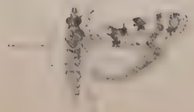
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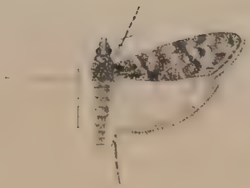
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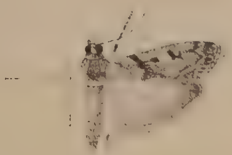
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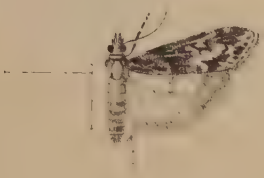
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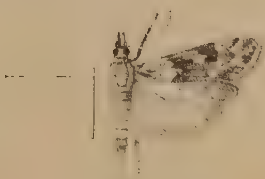
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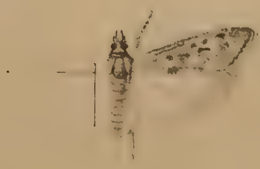
28

Edwin Wilson, lith. Cambridge

Meyrick. Macrolepidoptera.

FAUNA HAWAIIENSIS

VOL. I. PART III.

HYMENOPTERA PARASITICA

W. H. Ashmead

Price Twelve Shillings.
To Subscribers Six Shillings.

The Fauna Hawaiiensis is being published in parts at irregular intervals, and will it is hoped be completed in about two years.

Contributions have been made or promised by the following, viz.

W. H. Ashmead	*Hymenoptera Parasitica.*
The Lord Avebury, F.R.S.	*Thysanura* and *Collembola.*
F. E. Beddard, F.R.S.	*Earthworms.*
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It is also intended to give a list of the Vertebrates, with their distribution, in the Islands.

N.B. The parts of Volumes I. and II. are being published concurrently in order to expedite the completion of the work.

The price of each part will vary according to its extent and the number of Plates. Subscribers to the whole work will be charged half-price for each part. The parts will be sent, as published, to each subscriber who has paid for the preceding part.

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HYMENOPTERA PARASITICA

By W. H. ASHMEAD

FAUNA HAWAIIENSIS

OR THE

OOLOGY OF THE SANDWICH (HAWAIIAN) ISLES:

Being Results of the Explorations instituted by the Joint Committee appointed by

THE ROYAL SOCIETY OF LONDON FOR PROMOTING NATURAL KNOWLEDGE

AND THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

And carried on with the assistance of those Bodies and of the Trustees of

THE BERNICE PAUAHI BISHOP MUSEUM AT HONOLULU.

EDITED BY

DAVID SHARP, M.B., M.A., F.R.S.

SECRETARY OF THE COMMITTEE.

VOLUME I. PART III.

HYMENOPTERA PARASITICA BY W. H. ASHMEAD.

Pages 277—364; *Plates VIII and IX, uncoloured.*

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HYMENOPTERA PARASITICA.

By William H. Ashmead.

§ 1. General considerations.

THE Hawaiian Islands, on account of their volcanic origin and isolation from the continents of Asia and America, have a most interesting, and, in some respects, peculiar fauna which is well worth the closest study, although their early settlement, their close commercial relationship with various nationalities and the introduction of many plants and animals, not indigenous, render a study of the endemic species obscure and most difficult.

This difficulty is enhanced among the smaller insects easily transportable, especially among those of parasitic habits, and more particularly among species belonging to the orders Diptera and Hymenoptera, groups still very imperfectly known in temperate zones and almost totally neglected in tropical regions, but which have a wide geographical distribution.

It becomes of the greatest importance, therefore, to see that larger and more thorough zoological and botanical collections of the endemic species of these Islands be made before further inroads of modern civilization utterly destroy the indigenous species.

Our own government[1] and the authorities of the U. S. National Museum have been singularly remiss in their duty in this respect, and have left the exploration of these Islands, now a body politic of the United States, to others.

The present contribution to a knowledge of the parasitic Hymenoptera of these Islands is based mainly upon the explorations instituted by the Joint Committee appointed by various learned societies of England and assisted by the Trustees of the Bernice Pauahi Bishop Museum at Honolulu, Oahu, and upon the rather limited material in the U. S. National Museum, collected principally by Mr Albert Koebele and Mr H. W. Henshaw.

The principal part of this material, comprising nearly 1000 specimens, was made by Mr R. C. L. Perkins during a residence of about five years in these Islands, and was transmitted to me by Dr David Sharp, Secretary of the Joint Committee.

---

[1] That of the United States of North America. ED.

Superfamilies.	Families.	Subfamilies.	Genera.
VII. CHALCIDOIDEA.	LXII. Chalcididae	II. Chalcidinae	Chalcis Fabricius.
			Epitranus Walker.
	LXVI. Miscogasteridae	III. Miscogasterinae	Toxeuma Walker.
			Stictomischus Thomson.
		IV. Lelapinae	Neolelaps Ashmead, n. g.
			Mesolelaps Ashmead, n. g.
	LXVIII. Encyrtidae	I. Eupelminae	Solindenia Cameron.
			Eupelminus Dalla Torre.
			Eupelmus Dalman.
			Anastatus Motschulsky.
		II. Encyrtinae	Encyrtus Latreille.
			Bothriothorax Ratzeburg.
			Microterys Thomson.
			Adelencyrtus Ashmead.
	LXIX. Pteromalidae	II. Pteromalinae	Pteromalus Swederus.
		III. Sphegigasterinae	Tomocera Howard (= Moranila Cameron).
		IV. Spalangiinae	Spalangia Latreille.
	LXXI. Eulophidae	I. Entedoninae	Astichus Förster.
			Omphale Haliday.
		II. Aphelininae	Coccophagus Westwood.
		III. Tetrastichinae	Tetrastichus Haliday.
		IV. Elachistinae	Ophelinus Haliday.
		V. Eulophinae	Hemiptarsenus Westwood.
			Necremnus Thomson.
			Sympiesis Förster.
			Eulophus Geoffroy.
	LXXIII. Mymaridae	II. Mymarinae	Polynema Haliday.
VIII. ICHNEUMONOIDEA.	LXXIV. Evaniidae	I. Evaniinae	Evania Fabricius
	LXXVI. Ichneumonidae	II. Cryptinae	Hemiteles Gravenhorst.
		III. Pimplinae	Lissonota Gravenhorst.
			Echthromorpha Holmgren.
			Pimpla Fabricius.
		IV. Tryphoninae	Metacoelus Förster.
			Bassus Fallen.
		V. Ophioninae	Ophion Fabricius.
			Pleuroneurophion Ashmead.
			Athyreodon Ashmead.
			Banchogastra Ashmead.
			Pycnophion Ashmead.
			Eremotylus Förster.
			Enicospilus Curtis.
			Atrometus Förster.
			Idechthis Förster.
			Lathrostizus Förster.
			Limnerium Ashmead (= Limneria Holmgren).
	LXXVII. Alysiidae	II. Alysiinae	Aphaereta Förster.
			Aspilota Förster.

Superfamilies.	Families.	Subfamilies.	Genera.
VIII. ICHNEUMONOIDEA (*continued*).	LXXVIII. Braconidae...	IX. Cheloninae	Chelonus Jurine.
		X. Agathidinae	Microdus Nees.
		XII. Microgasterinae	Protapanteles Ashmead.
		XVI. Rhogadinae	Ischiogonus Wesmael.
		XVII. Spathiinae	Ecphylopsis Ashmead.

DISTRIBUTION.

In this work 14 families of parasitic Hymenoptera are recognized in the Hawaiian fauna, not a single one of which is peculiar to the archipelago, but, on the contrary, all have a wide geographical range, or at least have some representatives in all parts of the world.

These 14 families are represented by 128 species, distributed in 69 genera. Of these genera only 11 are, apparently, endemic or peculiar to the Islands, *viz.*, *Zacranium*, *Platymischodes*, *Hypodiranchis*, *Neolelaps*, *Mesolelaps*, *Solindenia*, *Pleuroneurophion*, *Athyreodon*, *Banchogastra*, *Pycnophion* and *Ecphylopsis*.

Most of the other genera, except *Ophelinus* Haliday and *Echthromorpha* Holmgren, are represented in nearly all the known faunae, North and South America, Europe, Africa, Asia and Australia, the two mentioned being more particularly confined to the Australian and Asiatic faunae.

Of the eleven genera mentioned as being apparently peculiar to the Islands, ten are here described for the first time, and there is but little doubt in my own mind that most of these will be found to have representatives in the Australasian fauna, from whence it is evident, taking all things into consideration, that the Hawaiian fauna was originally derived.

Of the one hundred and twenty-eight species of parasitic Hymenoptera enumerated, eighty-seven are supposed to be new and are here described for the first time, so that, for the present, nothing can be said of their distribution.

The known species, however, may be arranged into three categories, as follows:—

(1) Of Asiatic or Australasian origin (5 species).

Chalcis obscurata Walk., *Tomocera californica* How., (= *Moranila testaceiceps* Cam. = *M. testaceipes* D. T.), *Evania appendigaster* Linné and *E. sericea* Cam.

(2) Of North American origin (7 species).

Encyrtus fuscus How., *Coccophagus lecanii* Fitch, *C. ochraceus* How., *Hemiteles melitaeae* Ashm., *H. tenellus* Say, *H. variegatus* Ashm., and *Aphaereta muscae* Ashm.

(3) Of European origin (5 species).

Spalangia hirta Hal., *Tetrastichus hagenowi* Ratzeb., *Lissonota bellator* Grav., *Metacoelus femoralis* Fourc., and *Bassus laetatorius* Fabr.

Of the above species, *Evania appendigaster* Linné, parasitic on the oothecae of cockroaches, its hyperparasite, *Tetrastichus hagenowi* Ratz., *Metacoelus femoralis*, parasitic on Lepidopterous larvae, and *Bassus laetatorius*, parasitic on Dipterous larvae, are now cosmopolitan species.

BIBLIOGRAPHIC.

The literature relating to the parasitic Hymenoptera of the Hawaiian Islands is not extensive, the following being all that I have been able to find :—

1. CAMERON, P. Notes on Hymenoptera, with Descriptions of New Species. (Trans. Ent. Soc. London, 1881, pp. 555—562.)

   Describes: *Sierola* (n. g.) *testaceipes*, *Chelonus carinatus*, *Monolexis? palliatus*, *Chalcis polynesialis*.

2. ——. Descriptions of New Genera and Species of Hymenoptera. (Trans. Ent. Soc. London, 1883, pp. 187—193.)

   Describes: *Epitranus lacteipennis*, *Moranila testaceiceps*, *Solindenia* (n. g.) *picticornis*, *Eupelmus flavipes*, *Evania sericea*, *Limneria polynesialis*, *L. Blackburni*, *Ophion lineatus* and *O. nigricans*.

3. BLACKBURN, Rev. T. and CAMERON, P. On the Hymenoptera of the Hawaiian Islands. (Mem. and Proc. Manchester Lit. and Phil. Soc. (3), x. 1885—86, pp. 194—245.)

4. HOLMGREN, A. E. Kongliga Svenska Fregatten Eugenies Resa omkring Jorden under befäl of C. A. Virgin. Aren, 1851—1853. Zoologi I. Insecta. Stockholm, 1858—1868.

   Describes *Echthromorpha* (n. g.) *maculipennis*.

§ 2. Systematic account of the Hymenoptera Parasitica.

Superfamily III. *VESPOIDEA*.

Family XXXII. BETHYLIDAE.

This family, which is composed of purely parasitic species, is quite extensive and has representatives in all parts of the world. It was first correctly placed by A. H. Haliday, as early as 1839, among the so-called fossorial wasps, but was subsequently removed and treated by Prof. John O. Westwood as a subfamily in the family Proctotrypidae.

Following the views of Prof. Westwood, it was so treated by Förster, Thomson and most of the subsequent writers on these insects and by the author in his Monograph of the North American Proctotrypidae, published in 1893. Since that time, however, extensive studies in all families of the Hymenoptera have caused a radical change in my views, as to the classification of these insects, and I am now convinced that Haliday was right, that they have nothing in common with the Proctotrypidae, that they are far removed from the genuine Proctotrypids, and that they are more nearly allied to the genuine fossores. This position is also supported by the observations of Mr A. Busck, of the U. S. Department of Agriculture, who finds that at least some of them sting the larvae of their hosts into insensibility before oviposition, as the larger Aculeata do.

The family is divided into three subfamilies, and two of these are represented in the Hawaiian fauna by five genera, and one of these, namely, *Sierola* Cameron, was supposed to be endemic, but species have been recently described from New Zealand[1].

Subfamily I. *BETHYLINAE.*

SCLERODERMA Latreille.

1810. *Scleroderma* Latreille, Consid. Gener., p. 314.

Males ....5.
Females.
  Species brownish-yellow or castaneous, the abdomen, however, sometimes black......3.
  Species black or piceous black ....2.

2. Abdomen longer than the head and thorax united, the sutures of the dorsal segments not flavo-testaceous, although faintly testaceous in some specimens; legs mostly black or piceous brown-black, the incision of the joints and the tarsi flavo-testaceous; flagellum most frequently brownish-yellow, the scape brown, the pedicel yellow; head oblong quadrate, not narrowed behind, about one and a half times as long as wide; length 1·8 to 3 mm. ....(*1*) *S. perkinsi.*
  Abdomen much longer than the thorax, the structures of the dorsal segments, or at least 1 to 4 or 5 flavo-testaceous; antennae brownish-yellow; length 3 to 3·5 mm. ....(*2*) *S. polynesiale.*

3. Abdomen black ....4.
  Abdomen not black.
    Castaneous, the head and scutellum black or brown-black; scape, pedicel and legs yellowish, the femora and tibiae with a rufous tinge; abdomen elongate, much longer than the head and thorax united, the apices of segments 1 to 5, and the terminal segment, flavo-testaceous; length 2 to 2·8 mm. ....(*3*) *S. kaalae.*
    Uniformly pale castaneous; scape, pedicel and legs yellowish, the flagellum light brown; abdomen elongate, twice longer than the thorax, the apices of segments yellow; length 3 mm. ....(*4*) *S. lanaiense.*

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[1] Proc. Linn. Soc. N. S. Wales, 1900, p. 328.

4. Castaneous, the abdomen black, longer than the head and thorax united; dorsal abdominal segments 3 to 5 at apex yellowish; antennae, incision of the joints of the legs, the anterior tibiae, the hind tibiae at apex, and all the tarsi, yellowish; length 1·8 mm. ....(*5*) *S. nigriventre.*

Pale castaneous, the abdomen ovate, shorter than the head and thorax united, piceous black, the dorsal segments 2 to 5 at apex and the apical ventral segments yellowish; scape and pedicel yellow, the flagellum light brown; legs light brown, the coxae at apex, the trochanters, the incisions of the joints and the tarsi, pale yellowish; length 1·6 mm. ....(*6*) *S. breviventre.*

5. Piceous black, the abdomen brown-black, the claspers brownish-yellow; antennae brown; wings dusky or obscure hyaline ....(*1*) *S. perkinsi.*

(1) *Scleroderma Perkinsi*, sp. nov.

♀. Length 1·8 to 3 mm. Piceous black, the thorax under a strong lens exhibiting a feeble reticulate sculpture. Head oblong quadrate, about one and a half times as long as wide. Antennae short, not longer than the head, the tubercles and pedicel yellow, the flagellum brownish-yellow, the joints wider than long, the scape dark brown or castaneous. Legs black or piceous brown-black, the incisions of the joints and the tarsi yellowish. Mesonotum as long as the metathorax, slightly rounded and narrowed anteriorly, the pronotum hardly visible from above, the scutellum semicircular, a little longer than half the length of the mesonotum. Abdomen elongate, in most specimens black, and distinctly longer than the head and thorax united, the sutures of the dorsal segments not flavo-testaceous, although in some specimens the antennal sutures as well as the dorsal segments are faintly testaceous.

♂. Length 1·5 mm. Piceous black, the middle coxae rufous, the abdomen brown-black, the claspers yellowish; antennae filiform, sparsely pubescent, the joints of the flagellum a little longer than wide; wing subhyaline, ciliate.

Hab. Hawaii: Kona (3000 to 4000 feet).—Lanai: Koholuamano (2000 to 4000 feet) in April, 1894, 1895.

(2) *Scleroderma polynesiale* Saunders.

1881. *Scleroderma polynesialis* Saunders, Trans. Ent. Soc. London, 1881, p. 116, ♀.

1898. *Scleroderma polynesiale* Dalla Torre, Cat. Hym., v. p. 560, ♀.

"Long. corp. 3¾ mm. Sclerodermae piceae Westw., affinis sed gracilior, antennis tarsisque brevioribus; picea, unicolor, punctulatissima, abdomine valde elongato, thoracis latitudine fere coaequali, segmentorum basalium quatuor margine postico luteo-flavo. Ocelli alaeque obsoleti." (Saunders.)

Hab. Hawaii: Haleakala (4000 feet).

(3) *Scleroderma kaalae*, sp. nov.

♀. Length 2 to 2·8 mm. Castaneous, the head and scutellum black or brown-black; scape, pedicel, legs and first abdominal segment beneath yellowish, the femora and sometimes the tibiae with a decided rufous tinge. The head and the thorax appear smooth but under a strong lens exhibit a fine delicate reticulate sculpture. The head is less than one and a half times as long as wide, with a brownish tinge beneath. The mesonotum is long, about twice as long as the scutellum, slightly narrowed and rounded before. The metathorax is widened posteriorly, being at least one-half wider at apex than at base, the sides and apex abruptly truncate. The abdomen is elongate, subcylindrical, twice longer than the thorax, smooth and shining, with the apices of the segments 1 to 5 and the terminal segments flavo-testaceous.

HAB. Oahu: Kaala Mts. (3000 feet), in December, 1892. One ♀ specimen.

(4) *Scleroderma lanaiense*, sp. nov.

♀. Length 3 mm. Elongate, pale castaneous; scape, pedicel and legs yellowish, the flagellum light brown; apices of the abdominal segments more or less yellow. The head is less elongate than usual, being nearly quadrate or only a little longer than wide. The scape of the antennae is longer than half the length of the flagellum and slightly curved, the pedicel being a little longer than wide, while the joints of the flagellum, except the last, are transverse, the basal joints smaller, the last joint oblong, a little longer than the pedicel.

HAB. Lanai (3000 feet). One ♀ taken in January, 1894.

(5) *Scleroderma nigriventre*, sp. nov.

♀. Length 1·8 mm. Head, thorax and first segment of abdomen beneath castaneous; abdomen black, longer than the head and thorax united, with the apices of dorsal segments 3 to 5 narrowly yellowish; legs reddish-brown, the incisions of the joints, the anterior tibiae, the tips of the middle and the hind tibiae, and all tarsi, yellow. Antennae yellow (broken off at tips), the first three or four joints of the flagellum minute, wider than long. The head is oblong, about one and a half times as long as wide, the eyes oval, black. The mesonotum is fully twice as long as the scutellum, while the metathorax is only a little longer than wide and only slightly wider at apex than at base.

One ♀ specimen taken in January, 1894. Allied to *S. lanaiense*, but smaller, differently coloured and readily separated by the shape of the head and the metathorax.

HAB. Lanai (2000 feet).

(6) *Scleroderma breviventre*, sp. nov.

♀. Length 1·6 mm. Head, thorax and first abdominal segment pale castaneous; abdomen piceous black, the apices of dorsal segments and the apical ventral segments yellowish; scape, pedicel, trochanters, and tarsi, yellowish, the flagellum and rest of legs brown.

The head is oblong as in *S. nigriventre*, but the abdomen is much shorter, being distinctly shorter than the oblong head and the thorax united, and thus differing from all the other species described here. The joints of the flagellum, except the last, are all short, transverse, the first two or three being the smallest and narrowest joints; the last joint is oblong and as long as the penultimate and antepenultimate joints united.

Hab. Lanai (2000 feet). One ♀ taken in January, 1894.

Epyris Westwood.

1832. *Epyris* Westwood, Lond. and Edinb. Phil. Soc. (3), I. p. 129.

(1) *Epyris hawaiiensis*, sp. nov.

♀. Length 3·5 mm. Black; the antennae, except the last 6 or 7 joints which are dusky, the mandibles, the tegulae, and the legs, ferruginous, the coxae basally and the hind coxae posteriorly, black; dorsal abdominal segments 1 and 2 testaceous; wings hyaline with a dusky discoidal blotch toward apex.

The head is a little longer than wide, very finely, closely punctate. The thorax above is feebly coriaceous, the pronotum being long trapezoidal, longer than wide at base; the mesonotum is fully three times as wide as long, with a grooved line on each side near the tegulae; the scutellum has a grooved furrow across the base; while the metathorax is about twice as long as wide, rather abruptly, but somewhat obliquely, truncated at apex, the dorsum with several elevated longitudinal lines. The abdomen is long ovate, shining black, about as long as the head and thorax united.

Described from a single specimen, without number, and it is, therefore, impossible to tell upon which Island it was captured.

Hab. Hawaiian Islands. (Locality and date of capture not stated.)

Sierola Cameron.

1881. *Sierola* Cameron, Tr. Ent. Soc. London, 1881, p. 556.

This genus was originally characterized from specimens from the Hawaiian Islands and is apparently endemic, although the genus also occurs in New Zealand. It is evidently the prototype from which sprang the genus *Goniozus*, common to Europe and North America.

The genus is unknown in the European and American faunae, although I described a species, *Sierola ambigua*, doubtfully as such some years ago. This species, however, as I suspected at the time, has no relation with these insects or with the genuine Proctotrypids, but forms the type of a new genus, which I have called *Sierolomorpha*, in the family *Cosilidae*.

Mr Cameron characterized three species in this genus, which are here increased to eight species through the efforts of Mr Perkins, who suspects that they are parasitic upon species belonging to the Coleopterous family Cioidae. Mr Froggatt, however, has bred *Sierola antipoda* Ashmead, in New Zealand, from *Cecidomyia frauenfeldi*, a Dipterous insect, and if this record is correct it is more likely that the Hawaiian species will have similar habits, and probably attack Dipterous larvae associated with the Cioidae in the fungi. All other Bethylids, however, whose parasitism is known, attack only Coleopterous and Lepidopterous larvae, and Mr Froggatt's record should be confirmed by others before it is accepted as final.

Males ....7.
Females.
  Species, or at least more or less of the thorax, yellow or flavo-testaceous, the abdomen sometimes black ....5.
  Species black, the thorax always entirely black ....2.

2. Legs yellowish, testaceous, or at most with only the anterior coxae and femora black or fuscous ....4.
  Legs, or at least all the coxae and femora, black or dark rufo-piceous ....3.

3. Scape blackish, the pedicel and joints 1 and 2 of the flagellum flavo-testaceous; legs black, the anterior tibiae and all tarsi yellowish, the middle and hind tibiae dark fuscous or fuscous medially; flagellar joints 1 to 11 a little longer than thick ....*(3) S. molokaiensis.*
  Scape, pedicel and three or four joints of the flagellum flavo-testaceous; trochanters, knees, the anterior and middle tibiae usually, tips of hind tibiae and all tarsi yellowish; sometimes with all tibiae yellowish; flagellar joints submoniliform, 3 to 5 wider than long, the following not, or scarcely, wider than long..*(1) S. leuconeura.*
  Scape at base and apex, the pedicel and joints 1 to 3 of flagellum usually flavo-testaceous, or at least yellowish beneath; trochanters, all tibiae, except sometimes the hind pair medially, and all tarsi, yellowish.
    Joints of flagellum not moniliform, distinctly longer than thick......*(2) S. monticola.*
    Joints of flagellum 5 to 12 moniliform, or submoniliform, not, or scarcely, longer than thick ....*(1) S. leuconeura.*

4. Anterior coxae and femora more or less black or fuscous, rest of legs testaceous or yellowish.
    Clypeus with a highly elevated median carina; antennae, except the last 5 or 6 joints, brownish-yellow, rarely wholly yellowish; flagellar joints about twice as long as thick or somewhat shorter, the first being slightly the shortest joint..*(3) S. molokaiensis.*

Legs, including coxae, flavo-testaceous.
  Antennae with the first three or four joints (or more) yellow, joints 8 to 12 submoniliform, only a little longer than thick.
    Clypeus produced anteriorly into a broad rounded ledge; mandibles rufous with black teeth........(*4*) *S. oahuensis.*
    Clypeus normal, obtusely triangular anteriorly, but not produced into a projecting ledge........(*5*) *S. testaceipes.*

5. Mostly flavo-testaceous, the abdomen never black........6.
Mostly black, the abdomen always black.
  Pronotum alone yellow, rest of thorax black; legs yellow; head very distinctly longer than wide; flagellum tapering off toward apex, the joints all longer than thick........(*6*) *S. flavocollis.*
  Prothorax, mesonotum and scutellum yellow (rarely with the scutellum black), the head and rest of the thorax black; all legs yellow, the anterior and middle legs sometimes yellowish-white; head not longer than wide across the eyes; antennae yellow, slightly obfuscated toward apex, the flagellar joints a little longer than thick........(*7*) *S. collaris.*

6. Ocelli, the eyes and the metathorax black; all legs yellowish-white; head large, very slightly longer than wide across the eyes; antennae yellow, the flagellar joints moniliform, the intermediate joints not longer than wide......(*8*) *S. kauaiensis.*

7. Species, or at least more or less of the thorax, yellow........10.
Species, or at least the thorax, always black.
  Legs testaceous or yellowish, at the most with only the anterior coxae and femora black or fuscous........9.
  Legs, or at least all the coxae and femora, black, or the anterior femur and coxae beneath and toward apex reddish........8.

8. Coxae and femora black, the trochanters tibiae and tarsi yellowish; barely three joints of antennae yellowish, the joints beyond to the last moniliform, not or scarcely longer than thick........(*1*) *S. leuconeura.*
Anterior coxae and femora beneath and toward apex, the trochanters, tibiae and tarsi testaceous; basal two joints beneath reddish-yellow, the joints beyond all distinctly longer than thick........(*2*) *S. monticola.*

9. Clypeus produced into a ledge anteriorly.
  Antennae yellow, with the 4 or 5 terminal joints more or less dusky, all flagellar joints distinctly longer than wide, the first three about twice as long as wide........(*4*) *S. oahuensis.*
Clypeus normal, not produced into a ledge anteriorly.
  Antennae yellow, faintly dusky toward apex, the flagellar joints 5 to 10 submoniliform, not longer than thick........(*5*) *S. testaceipes.*

10. Abdomen black.
  Prothorax alone yellow........(*6*) *S. flavocollaris.*
  Prothorax, mesonotum and scutellum yellow........(*7*) *S. collaris.*
Abdomen never black.
  Body, except the metathorax, the ocelli and the eyes, wholly flavo-testaceous........(*8*) *S. kauaiensis.*

(1) *Sierola leuconeura* Cameron.

1886. *Sierola leuconeura* Cameron, P. Manchester Soc. xxv. p. 177.—1886. Cameron, Mem. Manchester Soc. (3), x. p. 238.—1898. Dalla Torre, Cat. Hym. v. p. 554.

♀. Length 2 mm. "Black; the knees, tibiae and basal half of antennae testaceous: the hind tibiae fuscous in the middle; antennae scarcely so long as the thorax, the basal joint shortly pedunculated, double as long as wide, double the length and thickness of the second, which is thinner and shorter than the third, the third to sixth thicker than the following, broader than long, the apical two joints subequal. Head and thorax smooth, faintly alutaceous. Abdomen shining, longer than the thorax. Wings semifuscous, nervures lacteous." (Cameron.)

♂. Length 1·8 mm. Black; basal three joints of the antennae, trochanters, tibiae and tarsi, except last joint, yellowish; funicle joints moniliform, scarcely longer than thick; otherwise as in female.

Hab. Hawaii: Kona (3000 feet) July 5, (4000 feet) July, October; Kilauea, in August.—Kauai: Mts. Waimea, in July.—Lanai: Makaweli (2000 feet), in June, (3000 feet) January.—Maui: Haleakala (5000 feet), in March.—Molokai: Mts. (4000 feet), in October and November.—Oahu: Kaala Mts. (2500—3000 feet), in December.

(2) *Sierola monticola* Cameron.

1886. *Sierola monticola* Cameron, P. Manchester Soc. xxv. p. 176.—1886. Cameron, Mem. Manchester Soc. (3), x. p. 237.—1898. Dalla Torre, Cat. Hym. v. p. 555.

♀. Length 4 mm. "Black; anterior tibiae and tarsi testaceous, the tips of the latter black; the base and apex of hind tibiae fusco-testaceous, the tarsi fuscous, paler in the middle; the extreme base and apex of basal joint of antennae and the second to fourth joint testaceous. Antennae scarcely so long as the thorax; the basal joint pear-shaped, narrowest at the base, a little longer than the third and fourth united; second joint a little longer than third, and of the same thickness; second to fourth longer and thicker than the other joints; the apical seven more moniliform than the others, and a little longer than broad; the last longer and thinner than the penultimate. Head smooth and slightly alutaceous; mandibles piceous at tip, faintly striated; thorax smooth, a little alutaceous. The abdominal segments laterally at their junction narrowly milk-white. Wings hyaline, stigma aud prostigma fuscous; nervures testaceous." (Cameron.)

♂. Length 2 mm. Black, basal two joints of antennae beneath, front coxae and femora beneath and toward apex, and tibiae and tarsi except last joint, testaceous;

funicle joints of antennae all distinctly longer than thick, but shortening towards apex; otherwise as in female.

Hab. Hawaii: Hualalai (5000 feet), in August; Kilauea; Kona (4000—5000 feet) June, (2000 feet) September.—Lanai: Halepaakai, in July.—Maui: Haleakala (5000 feet), in August.—Molokai: Kalae, in August.

(3) *Sierola molokaiensis*, sp. nov.

(Plate VIII. fig. 1.)

♀. Length 2 to 3·5 mm. Black, the head and thorax finely coriaceous but more or less shining; mandibles black or brown-black; abdomen smooth, impunctate, highly polished; antennae, except the four or five terminal joints, and the legs, except the front coxae and more or less of the front femora or at least above, testaceous or brownish-yellow; front coxae and front femora black or dark brown in part, the latter sometimes brownish only above or outwardly; wings hyaline, the parastigma and the stigma brown or fuscous, the other veins pallid or pale yellowish.

The head is distinctly longer than wide, with an acute ridge anteriorly between the insertion of the antennae, and clothed with a short, sparse pubescence. The antennae are much longer than the head, all the joints of the flagellum being distinctly longer than thick or from $1\frac{1}{2}$ to 2 times as long as thick.

♂. Length about 2 mm. Black; two or three basal joints of the antennae and the legs, flavo-testaceous, the rest of the antennae being dark fuscous or black. The anterior femora above or outwardly and sometimes the front coxae, more or less, are brown or fuscous. The joints of the antennae 5 to 6 are oval and very little longer than thick, joints 11 and 12 being moniliform, while the abdomen is oblong-oval, not longer than the thorax.

Hab. Hawaii: Kilauea, July, August; Kona (2000 feet), September.—Lanai (2000 feet), January.—Maui: Haleakala (5000 feet), in October.—Molokai: Kalae, in August (4000 feet), in May.—Oahu: Honolulu, in November; Waianae Mts. (3000 feet), in February.

(4) *Sierola oahuensis*, sp. nov.

♀. Length 2 to 2·3 mm. Black, the head and thorax microscopically coriaceous; mandibles rufous with black teeth; first three or four joints of the antennae yellowish, those beyond fuscous; legs testaceous, the upper ridge of the anterior femora sometimes with a brownish spot, the tarsi sometimes yellowish; tegulae dark rufo-piceous; wings hyaline, the veins, except the stigma and parastigma, pellucid.

The head is large, longer than wide, the clypeus being produced into a broad plate or ledge, rounded anteriorly and covering the mandibles. The joints of the flagellum 3 to 10 are moniliform and scarcely longer than thick.

♂. Length 1·9 mm. Agrees very closely with the female, except that the apex of the abdomen gapes open and exposes the genitalia, the produced clypeus is a little narrower and subtruncate anteriorly, not rounded, while the joints of the flagellum are longer, not moniliform, the joints all being distinctly longer than thick.

HAB. Hawaii: Kilauea, in July and August.—Oahu: Waianae Mts. (2000 feet), in March.

(5) *Sierola testaceipes* Cameron.

1881. *Sierola testaceipes* Cameron, Tr. Ent. Soc. London, p. 556, ♀.—
1898. Dalla Torre, Cat. Hym. v. p. 555.

"♀. Length 1½ lines. Black; head and mesonotum faintly alutaceous; abdomen smooth, shining; three basal joints of antennae and legs testaceous; abdominal segments at their junction dull testaceous. Wings deeply fringed, shorter than the thorax and abdomen, hyaline; stigma and parastigma fuscous; other nervures pale. Head and thorax covered with a scattered pubescence." (Cameron.)

♂. Length 1·8 mm. Black, the head and thorax feebly coriaceous; antennae, except the 5 or 6 terminal joints, and the legs, including the coxae, yellow. The head is not longer than wide, a little the widest across the eyes. The antennae are more than twice the length of the head, with joints 7 to 12 moniliform. Abdomen oblong oval, hardly as long as the thorax or no longer.

HAB. Sandwich Islands (Rev. Thomas Blackburn); Hawaii: Kilauea, in July and August; Kona (2000—3000 feet), in September; Olaa, in September.—Kauai: Halemanu (4000 feet), in April; Koholuamano, in March, high plateau in August and October; Mts. Waimea (4000 feet), in June.—Lanai: Halepaakai, in July (2000—3000 feet), in January and February.—Maui: Lahaina (2000 feet), in January.—Molokai in June.—Oahu: Kaala Mts. (3000 feet), in December; Mts. near Honolulu (2000—3000 feet); Waianae Mts. (2000—3000 feet), in February and April.

(6) *Sierola flavocollaris*, sp. nov.

♀. Length about 3 mm. Head, thorax, except the pronotum, and the abdomen black; pronotum, base of antennae and the legs, including coxae, flavo-testaceous; terminal joints of antennae fuscous; wings hyaline or only faintly tinged, the parastigma and the stigma brown, the veins pallid or pale yellowish. Head and thorax finely coriaceous, the head anteriorly subopaque. Abdomen hardly as long as the head and thorax united, polished, impunctate. The head is large, very distinctly longer than wide, with a median carina between the insertion of the antennae, while the antennae are a little longer than the head, all the flagellar joints being a little longer than thick, the joints 8 to 12 oval, submoniliform.

Described from 5 specimens. The species is allied to *S. collaris*, but it is larger, with a larger and quite differently shaped head.

Hab. Kauai: (high plateau), in August; Makaweli (2000 feet), in January.—Maui: Haleakala (4000 feet).

(7) *Sierola collaris*, sp. nov.

♀. Length 2 to 2·2 mm. Black, with the mandibles, the five or six basal joints of the antennae, the prothorax, except sometimes a dusky spot on the prosternum anteriorly, the mesonotum and usually (but not always) the scutellum, yellow; the palpi, the tegulae, and the legs, yellowish-white; mesopleura sometimes with a pale spot anteriorly beneath the tegulae; wings hyaline, the stigma and parastigma brown, the internal veins pallid. The head and thorax are feebly, microscopically sculptured, clothed with a sparse, short, whitish pubescence. The head is scarcely longer than wide across the eyes, the clypeus anteriorly obtusely triangular, with a delicate median carina. Antennae normal, the 7 or 8 terminal joints obfuscated or pale brownish, joints 5 to 12 submoniliform, scarcely longer than thick, the last ovate, a little longer than the preceding. Metathorax finely rugulose. Abdomen pointed ovate, about the length of the thorax, highly polished and impunctate.

Hab. Kauai: (high plateau), in August; Halemanu (4000 feet), in May; Koholuamano, in June.

(8) *Sierola kauaiensis*, sp. nov.

♀. Length 2 to 2·5 mm. Honey-yellow; stemmaticum, eyes and metathorax black; legs yellowish-white. The head is large, a little longer than the width across the eyes; the antennal joints 7 to 12 are moniliform, not longer than thick; the wings hyaline, the veins pallid, the stigma and parastigma tinged with brown; while the abdomen is ovate, highly shining, and a little shorter than the thorax.

Described from 3 specimens.

Hab. Kauai: Kaholuamano, in April.

Subfamily III. *DRYININAE.*

GONATOPUS Ljungh.

1810. *Gonatopus* Ljungh, Beitr. z. naturk. II. p. 161.

Dark reddish-brown; head anteriorly and beneath, the antennae, and the legs, except the anterior femora, yellow ....(*1*) *G. perkinsi.*

Rufo-testaceous, the thorax beneath blackish, otherwise similar to Perkinsi...(*2*) *G. haleakalae.*

(1) *Gonatopus perkinsi*, sp. nov.

(Plate VIII. fig. 2, ♀.)

♀. Length 3 mm. Head, thorax and abdomen dark reddish-brown, tinged with black, especially the thorax beneath, the head in front and behind yellowish, with usually a black spot on the vertex, enclosing the ocelli; the antennae, the mandibles, the palpi and the legs, except the swollen anterior femora, which are rufo-piceous, are yellow. The head and the anterior lobe of the thorax are coriaceous, the posterior lobe of the thorax being strongly transversely striated. Abdomen oval, not longer than the posterior lobe of the thorax, but broader, smooth and polished, the petiole black, some of the segments tinged with blackish, while the hypopygium is yellow. The antennae are slightly thickened toward apex and extend a little beyond the base of the posterior thoracic lobe, with the third joint the longest, about as long as joints 4—5 united.

Described from 3 specimens.

HAB. Hawaii: Kilauea, in July.—Molokai, in June.

(2) *Gonatopus haleakalae*, sp. nov.

♀. Length 3 mm. Reddish; the vertex of the head is dusky, the lobes of the thorax beneath and the petiole of the abdomen are blackish, while the antennae and the legs are wholly yellow. The sculpture of the species is almost exactly as in *perkinsi*, except that the anterior thoracic lobe is smooth and highly polished.

Described from one specimen. Very close to *perkinsi* and possibly only a variety of it.

HAB. Maui: Haleakala.

LABEO Haliday.

1833. *Labeo* Haliday, Ent. Mag., I. p. 273.

(1) *Labeo hawaiiensis*, sp. nov.

♂. Length 1·9 mm. Black; clypeus anteriorly and the mandibles pale yellowish; ocelli red, arranged on a slight curved line; antennae about as long as the body, filiform, light brown, pubescent, the joints of the flagellum subequal, the first not longer than the scape and pedicel united, the last joint a little longer than the penultimate; legs brownish-yellow, the hind coxae and the middle and hind femora more or less obfuscated.

Head in front subconvex, highly polished, impunctate, behind strongly concave, the eyes rounded pubescent. Thorax narrowed anteriorly, the mesonotum minutely, feebly punctate, with distinct parapsidal furrows which converge toward the base of the scutellum; metathorax longer than wide, finely rugulose. Wings hyaline, pubescent, the tegulae and the stigma light brown, the veins more yellowish. Abdomen rather small, depressed, in outline oblong-oval, shorter than the thorax, polished black, the first segment foveate above.

Described from a single specimen.

Hab. Molokai Mts. (4500 feet), in August.

Superfamily V. *PROCTOTRYPOIDEA.*

Family LII. PROCTOTRYPIDAE.

Proctotrypes Latreille.

1796. *Proctotrypes* Latreille, Préc. car. gén. Ins., p. 108.

(1) *Proctotrypes hawaiiensis*, sp. nov.

♀. Length 2·9 to 3·5 mm. Polished black, the two or three terminal abdominal segments more or less at sides and beneath, and the aculeus at apex, reddish; antennae brown, becoming blackish toward apex, the ring-joint and the first joint of the flagellum more or less yellowish; legs, except coxae which are black, ferruginous.

The head is transverse, about three times as wide as thick antero-posteriorly, with the ocelli pale and arranged in a triangle. The pronotum at the sides is lineated, with the lateral anterior angles acute. The mesonotum and the scutellum are smooth impunctate; while the metathorax at the sides and posteriorly is rugulose, with two oblong areas on the metanotum as in *P. abruptus* Say. Wings hyaline, the internal veins entirely obliterated, the stigma brown, the costal and subcostal veins very pale or yellowish, the tegulae testaceous.

Many specimens. The species is allied to *P. abruptus* Say and will come next to it in a table of our species.

HAB. Hawaii: Kona (2000—3000 feet), June & July (3500 feet), in July (4000 feet), in August; Olaa, June.—Maui: Haleakala (4500 feet), in March (8000 feet), in April.

Family LIV. *DIAPRIIDAE*.

This family is represented by three distinct genera, two of which are new.

Subfamily II. *DIAPRIINAE*.

ZACRANIUM, gen. nov.

♀. Apterous. Head large, compressed, but not much wider than the compressed thorax; seen from above it is oval, a little longer than wide; seen from the side it is about twice as high as long, the antennae being inserted on a slight ledge far below the middle. Eyes facetted, small, almost round and situated toward the side of the head much below its middle. The mandibles project slightly and are bidentate, the inner tooth acute. The antennae are 12-jointed, as long as the body; the scape long, subclavate, about as long as the first four joints of the flagellum united; pedicel obconical, not short, about two-thirds the length of the first joint of the flagellum, the latter being the longest joint of the flagellum, about as long as joints 2 and 3 united; the flagellum is incrassated towards the apex, joints 4 to 9 moniliform, the 10th or last antennal joint being oblong and as long as the two preceding joints united. The thorax is compressed and about one-third the width of the abdomen at its widest part; above it is convex and a little more than thrice as long as wide, the scutellum not being differentiated, the collar at the sides and the metathorax, as well as the petiole of the abdomen, being clothed with a pale woolly pubescence. Abdomen oblong oval, about as in the European genus *Platymischus* Westwood, the second segment occupying nearly its whole surface.

(1) *Zacranium oahuense*, sp. nov.

(Plate VIII. fig. 3, ♀.)

♀. Length 2·8 mm. Polished, shining, the head and abdomen black, the thorax rufous, the collar, metathorax and the petiole clothed with a dense woolly pubescence; first two joints of the antennae and the legs, including the coxae, flavo-testaceous, the flagellum, except joints 1 and 2, which are more or less brownish, being black.

Described from 1 ♀ specimen.

HAB. Oahu: Waianae Mts., in June.

PLATYMISCHOIDES, gen. nov.

♀. Agrees well with *Platymischus* Westwood in having the head oblong, in the absence of ocelli, and in its abdominal characters, but otherwise it is quite distinct: the antennae are 12-jointed, and the scape is not dilated as in *Platymischus*; the scutellum is present but indistinctly separated from the mesonotum, while the legs are normal, not especially shortened as in *Platymischus*, and agree with those found in many genera of the Diapriidae.

(1) *Platymischoides molokaiensis*, sp. nov.

(Plate VIII. fig. 4, ♀.)

♀. Length 1·3 to 1·8 mm. Polished black, the antennae dark brown, almost black, the scape black, while the legs are dark rufopiceous, the tibiae at base and the tarsi being more or less yellowish.

The antennae are long, but little shorter than the body, the scape being about as long as the first four joints of the flagellum united; pedicel obconical, scarcely so long as the second funicle joint; the first joint of the flagellum is a little longer than the second, the third to the fifth nearly equal, those beyond to the last being moniliform, while the last joint is fusiform and a little shorter than the two preceding joints united.

Described from 3 ♀ specimens.

HAB. Molokai, in the mountains (4000 feet), in October.

PHAENOPRIA Ashmead.

1893. *Phaenopria* Ashmead, Monogr. North Am. Proctotryp., p. 436.

(1) *Phaenopria hawaiiensis*, sp. nov.

♀. Length 1·1 mm. Polished black, impunctate; antennae 12-jointed, light brown or brownish-yellow, dusky toward tips, the flagellum subclavate, gradually thickened towards apex, without a well-defined, separable club, but with the last joint much the largest ovoid, and a little longer than the two preceding joints united. Wings hyaline, the veins yellowish, the stigma being represented by a small brownish dot. Legs dark brownish or dark rufo-piceous, the trochanters, base of tibiae and the tarsi, except the last joint, yellowish.

♂. Length 1 mm. Agrees well with the female except in having a smaller abdomen and in its antennal characters. The antennae are longer than the body, 14-jointed, the first joint of the flagellum being slightly longer than the second, the second beneath angulated, while the following joints are elliptic-oval, subpedunculate, and clothed with sparse hairs.

Described from a single ♀ and ♂ specimen.

HAB. Molokai (3500 feet), in July.

Family LVI. SCELIONIDAE.

Subfamily IV. *SCELIONINAE.*

ANTERIS Förster.

1856. *Anteris* Förster, Hym. Stud., II., pp. 101, 113.

Females.

1. Legs, including coxae, honey-yellow or brownish-yellow ....4.
   Legs mostly black, the knees, sometimes base of tibiae and tarsi, honey-yellow or testaceous ....2.
2. Antennae not wholly black, the pedicel and the funicle joints 1 to 5 brown .... 3.
   Antennae wholly black or at most with the pedicel at apex alone testaceous.
   - First joint of antennal club as wide as the second; legs, except a spot on the knees, black ....(*1*) *A. nigricornis.*
   - First joint of antennal club hardly half the width of the second; legs blackish but with the trochanters, knees, base of tibiae and the tarsi, except the last joint, honey-yellow or testaceous ....(*2*) *A. tarsalis.*
3. First joint of antennal club only about twice as wide as long, narrower than the second; legs black, with the trochanters, base of tibiae and the tarsi, except last joint, honey-yellow ....(*3*) *A. hawaiiensis.*
4. Scape and pedicel honey-yellow, the rest of the antennae black; first joint of club twice as wide as long but narrower than the second ....(*4*) *A. perkinsi.*

(1) *Anteris nigricornis*, sp. nov.

♀. Length 2·9 mm. Opaque black, the head finely, closely punctate, the punctuation of the thorax still finer. Eyes large, oval, finely hairy. Ocelli triangularly arranged, the lateral almost touching the eye margin. Antennae 12-jointed, black; the first joint of the funicle is the longest, cylindrical, a little more than thrice as long as thick, the second a little shorter, the third very slightly shorter than the second, the fourth a little longer than thick, the fifth moniliform, subpedunculate; club 5-jointed, with the first joint as wide as the second.

Thorax with distinct parapsidal furrows, the postscutellar ridge angulated at the middle, the metathorax finely rugoso-punctate, the upper hind angles subdentate. Wings dusky hyaline, the tegulae piceous, the venation dark brown, nearly black, the stigmal vein paler, scarcely longer than the marginal vein and ending in a small, pale knob. Legs black, the knees testaceous or honey-yellow, the anterior and middle tarsi with a brownish tinge. Abdomen fusiform, longer than the head and thorax united, the first segment longitudinally striate, the second more delicately striate and separated from the first by a crenate line at base.

Described from 1 ♀ specimen.

HAB. Lanai (3000 feet), in January 1894.

(2) *Anteris tarsalis*, sp. nov.

♀. Length 2·6 mm. Comes very close to *A. nigricornis* but differs as follows: the third joint of the funicle is much shorter, being only about half the length of the first, the fourth and fifth being nearly equal, moniliform; the first joint of the club is much smaller and not nearly as wide as the second joint; the trochanters, knees, base and tips of tibiae and the tarsi, except the last joint, are honey-yellow or testaceous; the stigmal vein is distinctly longer, its staff, without the knob, alone being longer than the marginal vein; while the three or four apical segments of the abdomen are smoother, slightly polished.

Described from 2 ♀ specimens, one without number or locality label but presumably taken in Hawaii.

Hab. ? Hawaii.—Kauai: Makaweli (2000 feet), in January.

(3) *Anteris hawaiiensis*, sp. nov.

♀. Length 2·5 to 2·7 mm. Opaque black, coriaceous or finely, closely punctate, and sparsely clothed with a short pubescence; first and second segments of the abdomen longitudinally striate; pedicel and funicle joints 1 to 5 brown, or brownish-black; knees, and sometimes base and apex of tibiae, as well as tarsi basally, testaceous; wings hyaline, faintly tinged, the venation brown-black, the marginal vein about two-thirds the length of the stigmal, the latter ending in a small, rounded knob, the postmarginal vein being nearly thrice as long as the marginal.

The head is transverse-quadrate, with the eyes large oval, faintly hairy. The antennae are 12-jointed and terminate in a 5-jointed club; the first joint of the funicle is the longest joint, about thrice as long as thick, while the fourth and fifth joints are moniliform, subequal; the first joint of the club is about twice as wide as long but much narrower than the following joints. The thorax has the parapsidal furrows distinct to the base of the scutellum but widely separated, while the postscutellar ridge is distinctly angulated at the middle. The abdomen is fusiform, longer than the head and thorax united, the first segment much shorter than the second but both longitudinally striate, the second more delicately striate, the following segments being finely, closely punctate, the fourth to the seventh subpolished.

Described from two specimens.

Hab. Lanai: Makaweli (2000 feet), in January.

(4) *Anteris perkinsi*, sp. nov.

♀. Length 2·5 mm. Black, subopaque, finely, closely punctate; scape, pedicel, and legs, including coxae, honey-yellow. The first three joints of the funicle are cylindrical, the first the longest but very little longer than the second, the third about the length of the fourth and fifth united, which are moniliform; club 5-jointed, the first being twice as wide as long but narrower than the second. The metathorax has the upper hind angles dentate, the postscutellar ridge being angulated at the middle. Wings hyaline, the veins pallid. Abdomen alutaceously punctate, with the first segment striate, the second aciculate, the aciculations evanescent towards the apex.

Described from one specimen.

HAB. Kauai: Makaweli (2000 feet), in January.

Superfamily VI. *CYNIPOIDEA.*

This large complex, which comprises two families and several subfamilies with quite diverse habits, some being phytophagous, some inquilinous, and others parasitic, is here noted from the Hawaiian Archipelago for the first time by several representatives belonging to the subfamily Eucoelinae.

All of the species in this subfamily, so far as the published records go, seem to confine their attacks to the larvae and puparia of the Diptera.

Family LVIII. FIGITIDAE.

Subfamily V. *EUCOELINAE.*

PILINOTHRIX Förster.

1869. *Pilinothrix* Förster, Verh. zool.-bot. Gesell. Wien, XIX. pp. 345 & 358.

(1) *Pilinothrix bicolor*, sp. nov.

♀. Length 2·5 mm. Polished, impunctate; head and thorax mostly black, the mesonotum, scutellum and abdomen reddish-brown or castaneous; legs brownish-yellow; wings hyaline, pubescent, the tegulae and veins brownish, the marginal cell open along the front margin except near the base.

The antennae are 13-jointed, as long or a little longer than the body, black, the scape obconical, a little shorter than the first joint of the flagellum, the pedicel oval, the flagellum slightly and gradually thickened towards apex, the joints long, subcylindrical, fluted, sparsely pubescent and subequal in length, about 3½ times as long as thick, the first two or three joints slenderer than the following but scarcely perceptibly shorter than the fifth joint. The sides of the scutellum are longitudinally striate and clothed with a few glittering hairs, the cup being long, ellipsoidal. The metathorax is finely rugulose, clothed with a short, sparse pubescence and has a median carina. The abdomen is compressed, pointed at apex and considerably longer than the head and thorax united, with some pubescence at extreme base, the girdle not being well defined, the petiole being extremely short and striate.

♂. Length 2 mm. Wholly black, except the legs, the antennae being very much longer than in the female, 15-jointed, the joints of the flagellum all long, subcylindrical and fluted, the first two a little shorter than the following, subequal; abdomen much shorter than in the female, not longer than the head and thorax, blunt at apex; otherwise as in the female.

Described from 1 ♂ and 2 ♀ specimens.

Hab. Hawaii: Kilauea, in September.

Trybliographa Förster.

1869. *Trybliographa* Förster, Verh. zool.-bot. Gesell. Wien, xix. pp. 345 & 359.

(1) *Trybliographa hawaiiensis*, sp. nov.

♀. Length 2·2 mm. Polished black; first two joints of antennae rufo-piceous; legs brownish-yellow; wings hyaline, the veins brown, the marginal cell completely closed, the cubitus distinct to near the apex of the wing but becoming pale coloured just beyond its origin.

The antennae are 13-jointed and extend to the base of the abdomen; the scape is obconical, nearly as long as the first joint of the flagellum but much thicker, the pedicel globose; the flagellum gradually and imperceptibly thickens towards the apex, the last joint being ovate, nearly as long as the first joint but fully twice as thick; the first joint of the flagellum is subcylindrical, a little thicker at apex than at base, and, although the slenderest joint, it is yet the longest; the following joints are all fluted, oval or submoniliform, not much longer than thick, the second joint being shorter and not so stout as the third. The scutellum is longitudinally striate at the sides, the cup being narrow, ellipsoidal. The metathorax is opaque, pubescent and has a sharp carina down the middle. The abdomen is compressed, but not longer than the head and thorax united, with an elevated, densely pubescent girdle at base, and seen from the side has its apex obliquely truncate.

Described from one ♀ specimen, taken in January 1896, from a decaying stem of a Lobelia tree.

Hab. Hawaii: Hilo (2000 feet).

AGLAOTOMA Förster.

1869. *Aglaotoma* Förster, Verh. zool.-bot. Gesell. Wien, XIX. pp. 344 & 354.

Two distinct species, belonging to this genus, have been recognized, differing greatly in size and requiring no table for their separation.

(1) *Aglaotoma rufiventris*, sp. nov.

♀. Length 2·5 mm. Polished black, the abdomen, except along the dorsum and at apex, dark rufous; legs reddish-yellow. The antennae are 13-jointed, filiform, a little longer than the body, pilose; the scape is obconical, about as long as the first joint of the flagellum but stouter; the pedicel is subglobose, a little longer than thick; the first joint of the flagellum is the shortest joint, being only about two-thirds the length of the second joint; the following joints are all a little longer than the second, subequal, except the last, which is slightly longer than the penultimate joint. The scutellum at the sides is rugulose, the cup being rather large oval with a large fovea at apex and two or three minute punctures along the lateral margins. The metathorax is finely wrinkled and bicarinate. The abdomen is hardly so long as the head and thorax united, blunt at apex, with tufts of pubescence on each side at base.

HAB. Hawaii: Kilauea, in July. One ♀ specimen.

(2) *Aglaotoma molokaiensis*, sp. nov.

♀. Length 1·3 mm. Polished black; antennae brown, the two basal joints yellowish; legs brownish piceous, the trochanters, apices of the femora, anterior tibiae and tarsi and basis of the hind tibiae and tarsi, honey-yellow; wings hyaline, the veins pale yellowish, the marginal cell closed.

The antennae are 13-jointed, gradually thickened toward apex, the first two joints of the flagellum subequal, the first slightly the shorter, the joints beyond delicately fluted, stouter, ellipsoidal and a little longer than thick. The scutellum is indistinctly aciculated at the sides, the cup being oblong-oval, with a small fovea at apex, and two microscopic, scarcely perceptible punctures on each side before the fovea. Metathorax subopaque, sparsely pubescent and bicarinate. The abdomen, seen from above, is obovate, slightly compressed and not or scarcely longer than the thorax.

Described from 1 ♀ specimen.

HAB. Molokai Mts. (4000 feet), in November.

DIRANCHIS Förster.

1869. *Diranchis* Förster, Verh. zool.-bot. Gesell. Wien, XIX, p. 360.

Polished black.

Legs dark red, the coxae and sometimes more or less of the femora, especially basally, black; marginal cell open all along the front margin ....(*1*) *D. monticola.*

Legs, including coxae, red, the hind tarsi fuscous; marginal cell along the apical half or more open ....(*2*) *D. rufipes.*

(1) *Diranchis monticola,* sp. nov.

♀. Length 2·4 to 2·6 mm. Polished black, the legs dark red, the coxae and sometimes more or less of the femora, especially basally, black; wings hyaline, or at most with a faint tinge, the veins brown, the marginal cell open all along the front margin.

The antennae are 13-jointed, very sparsely pilose and reach to the base of the abdomen, the flagellum being very slightly thickened toward the apex; flagellar joints 3 to 10 moniliform, fluted, the third the smallest joint a little shorter than the second, the first joint being long, subcylindrical and nearly as long as 2 and 3 united, the last joint ovate and longer than the penultimate. The scutellum is striate at the sides, the cup being large oval, its disk not flat, but subconvex, with a round fovea posteriorly. Metathorax rugulose with a median carina, above bare, at the sides pubescent. The abdomen is not longer than the thorax, blunt at apex and with a distinct woolly girdle at base.

HAB. Molokai Mts. (4000 feet), taken June 15.

(2) *Diranchis rufipes,* sp. nov.

♀. Length 2 mm. Polished black, the legs red with hind tarsi fuscous; wings hyaline, the veins rufo-testaceous, the marginal cell open along the front margin for more than its apical half.

The antennae are 13-jointed, sparsely pilose and extend to the middle of the abdomen, being somewhat longer than in the preceding species; the first joint of the flagellum is the longest joint, cylindrical, and about one-third longer than the second; the second and the following joints are elliptic oval, fluted and not quite thrice as long as thick.

The scutellum is rugose at the sides, the cup being elongate oval and with a fovea posteriorly and some microscopic punctures along the lateral margins. The metathorax is wrinkled and slightly produced into a little neck posteriorly, its disk being bicarinate.

The abdomen is not quite as long as the head and thorax united and has a thinly pubescent girdle at base.

♂. Agrees well with the ♀, except that the abdomen is smaller, the antennae and legs being more of a brownish-yellow, not distinctly red, the hind coxae being blackish at base, while the antennae are slightly dusky toward apex, have 15 distinct joints, and are longer than the whole insect, the joints of the flagellum being long, cylindrical, subequal in length, and nearly four times as long as thick.

HAB. Lanai: Halepaakai (3000 feet). Taken in January and July.

HYPODIRANCHIS, gen. nov.

(Type H. hawaiiensis.) This new genus will fall in a table of the genera of the Eucoelinae between *Diranchis* Förster and *Heptamerocera* Ashmead. From the former it differs principally by its scutellar characters, the cup of the scutellum being smaller, neither large-oval nor rounded, but small, narrow and ellipsoidal; from *Heptamerocera* and allied genera, i.e., *Hexaplasta*, *Pentamerocera*, &c., it is readily separated by its antennal characters, the antennae in the female being without a distinctly differentiated club: the first two joints of the flagellum are thinner and shorter than the following joints and about equal, or nearly, in length; joints 5 to 13 are always somewhat stouter than joints 3 and 4, all fluted and more or less ellipsoidal in outline. Metathorax bicarinate. Wings pubescent, well ciliated at apex, the marginal cell being more or less distinctly open along the front margin, the second abscissa of the radius being straight or nearly, and clavate, or thickened towards apex, and one-half longer than the first.

(1) *Hypodiranchis hawaiiensis*, sp. nov.

(Plate VIII. fig. 5, ♀.)

♀. Length 1·5 mm. Polished black; mandibles, first four joints of the antennae and the tegulae testaceous; legs, including coxae, brownish-yellow; wings hyaline, the veins brown. The antennae are almost the length of the body, 13-jointed, sparsely pilose, joints 5 to 12 ellipsoidal, subequal, all a little longer than the third, about 2½ times longer than thick, the last joint ovate, longer than the penultimate and also fluted. The scutellum is longitudinally striate along the sides, the cup being very narrow, ellipsoidal in outline and with a small fovea at apex. The metathorax, except the pleura, broadly at base, is wrinkled or irregularly lineated, opaque and feebly pubescent. The marginal cell in the front wings is open along its front margin from near its base; while the abdomen is normal, hardly longer than the head and the thorax united, blunt at apex and with a narrow pubescent girdle at base.

HAB. Hawaii: Kona (4000 feet). Two ♀ specimens taken in August.

(2) *Hypodiranchis lanaiensis*, sp. nov.

♀. Length 2·7 mm. Polished black; the mandibles, except the teeth, the first five joints of the antennae, and the legs are brownish-yellow; palpi pale yellowish-white, the last joint of the maxillary palpi being fuscous; tegulae rufo-piceous; wings hyaline, pubescent, the veins yellowish, the marginal cell being open along the apical two-thirds of the outer margin.

The mandibles are 3-dentate, the two outer teeth being acute. The antennae are long and filiform, about the length of the body, sparsely pilose, the joints 5 to 13 being fluted; the flagellar joints, except possibly the first, are very nearly equal in length, about four times as long as thick, joints 1 and 2, however, being slightly slenderer and proportionately longer. The scutellum at the sides is rugose or coarsely wrinkled, the cup being ellipsoidal and flat and smooth on its disk. The metathorax is finely wrinkled, bicarinate above, the surface on either side of the carinae being pubescent. The abdomen is scarcely so long as the head and thorax united, black, but narrowly testaceous along the venter and with a narrow, pubescent girdle at base.

Hab. Lanai (2000 feet). One ♀ specimen, taken in December.

Hexaplasta Förster.

1869. *Hexaplasta* Förster, Verh. zool.-bot. Gesell. Wien, xix. p. 15.

(1) *Hexaplasta konensis*, sp. nov.

♀. Length 1·5 mm. Polished black; first six joints of the antennae and the mandibles brownish-yellow, the apical joints of the antennae blackish; legs, including coxae, yellow; wings hyaline, ciliate, the veins in front wings brownish-yellow, in the hind wings very pale yellowish; tegulae brownish-piceous.

The antennae are 13-jointed and extend a little beyond the middle of the abdomen, the 6 terminal joints, constituting the club, being elliptic-oval, striate, and stouter than the preceding; the first joint of the funicle is the slenderest and the longest, being about one-half longer than the second, while the second and fourth joints are equal, a little longer than the third. The scutellum is rugulose at sides, the cup being smooth, its disk sub-concave, with a depression or fovea at apex. The metathorax is short, finely rugulose and pubescent. The abdomen is normal, hardly as long as the head and thorax united, with the usual woolly girdle at base. The wings are badly torn at apex, but enough remain to make out the colour of the veins and to see that the marginal cell was closed along its front margin.

Hab. Hawaii: Kona (2500 feet). One ♀ specimen, taken in July.

Superfamily VII. *CHALCIDOIDEA.*

Of this large complex, the families Agaonidae and Torymidae, common in all tropical countries, are not represented in any collections that I have seen, taken on these Islands, although we should expect that both, or at least the last mentioned, must occur there.

Family LXII. CHALCIDIDAE.

EPITRANUS Walker.

1834. *Epitranus* Walker, Ent. Mag. II. pp. 21 and 26.

(1) *Epitranus lacteipennis* Cameron.

1883. *Epitranus lacteipennis* Cameron, Trans. Ent. Soc. London, p. 187. 1898. Dalla Torre, Cat. Hym. v. p. 383.

Length 4½ mm. "Dark reddish testaceous; the head behind, more or less of the lobes of the mesonotum, pleura, sternum, metanotum, petiole for the most part, abdomen more or less at the sides and above, coxae and femora in the middle, blackish. Antennae not much longer than thorax, becoming very gradually thickened towards the apex, which is sharply conical; the joints of the flagellum blackish at the apex. Head obsoletely punctured, covered with scattered silvery white short hairs; hind ocelli situated on the edge of the head behind. Thorax coarsely punctured; in the centre of the mesopleura is a shining semi-oblique line; in front of this line the pleura is obliquely striated. The scutellum is margined behind, the border shortly projecting. Metanotum reticulated, finely punctured. Petiole carinated at the side, longitudinally striated. The 2nd abdominal segment is longer than the petiole; its basal half is smooth and shining, the apical finely punctured; the posterior coxae are not much shorter than the femora, which are somewhat alutaceous, and, with the coxae, are covered with short pale hairs; the femora have nine short blunt teeth, those at the apex being the shortest. Wings a very little longer than the abdomen, lacteous; nervures pallid; cubitus almost obsolete." (Cameron.)

HAB. Oahu. Not in the Perkins Collection.

CHALCIS Fabricius.

1789. *Chalcis* Fabricius, Mant. Ins. I. p. 272.

Black, strongly, umbilicately punctate.

Length 3 to 4 mm. Tegulae, except a large brown spot at base, the apices of femora, the tibiae, except a broad black band medially, and the tarsi, pale yellow, the black band on the anterior tibiae not interrupted beneath, the hind tibiae with a black annulus at base, the hind coxae *sometimes* toward apex and beneath rufous; hypopygium yellowish ....(*1*) *C. polynesialis.*

Length 4·5 to 5·5 mm. Tegulae, except narrowly at base, apices of femora and tibiae, and the tarsi, except the last joint, lemon-yellow, the tibiae *beneath* more or less striped with black, the hind tibiae with a black annulus at base outwardly but connected with the black colour beneath; hypopygium black ....(*2*) *C. obscurator.*

(1) *Chalcis polynesialis* Cameron.

1881. *Chalcis polynesialis* Cameron, Trans. Ent. Soc. London, 1881, p. 561.
1898. Dalla Torre, Cat. Hym. v. p. 391.

♀ ♂. Length 2·8 to 3·1 mm. "Black, covered sparsely with a longish silvery pubescence. Base of scape, a line on the pronotum behind, and the scutellum more or less ferruginous. Anterior legs with the trochanters, femora, and tibiae reddish yellow, paler at the apex, and more or less fuscous in the middle; hinder legs with the coxae reddish, black behind; trochanters and base of femora reddish, the rest black, save a yellow spot above at the apex, which is reddish beneath; tibiae black at the extreme base; next to this is a clear yellow ring, the centre is black, more or less reddish on lower side, the apex clear yellow on outer side, the sides and lower parts reddish-yellow; tarsi yellowish-testaceous, the extreme apex fuscous. Head and thorax covered with shallow punctures; those on the head and prothorax are smaller than those on the middle of the mesonotum, which are again slightly smaller than those on the scutellum; lateral lobes of mesonotum with finer punctures than on the head. Metanotum with larger punctures than on the scutellum. Scutellum rounded behind, and with a transverse indistinct ridge on the apex. Abdomen not much longer than the thorax, ovate, pointed at the apex, smooth, shining, impunctate, almost glabrous at the base, the four apical segments clothed at the sides and beneath with a longish white pubescence. Wings hyaline; tegulae yellow; the teeth on femora are very strongly developed, especially at the apex.

"Seemingly a variable species as regards colouration. One of my specimens has only the apex of the scutellum reddish; another has it entirely of that colour, as well as the apex of the mesonotum. The colour of the legs also varies." (Cameron.)

HAB. Oahu: Honolulu (Blackburn); Waialua, Koolau range in February (Perkins).—Hawaii: Hilo, in July (H. W. Henshaw).

(2) *Chalcis obscurata* Walker.

1874. *Chalcis obscurata* Walker, Trans. Ent. Soc. London, p. 399, ♂. 1898. Dalla Torre, Cat. Hym. v. p. 390.

♂. Length 2¾ lines. Nigra, abdomen apicem versus cinereo-tomentosum; femora, apices tibiae tarsesque flava; tibiae subtus nigro-vittatae; tibiae postice nigrae; alae cinereae.

Body, antennae and legs black, with the usual structure. Body convex. Head and thorax scabrous, dull. Antennae stout, nearly filiform. Prothorax about four times as broad as long. Sutures of the parapsides distinct. Abdomen smooth, shining, subsessile, with cinereous tomentum towards the tip. Femora yellow at the tips, hind femora minutely denticulate beneath. Tibiae yellow beneath, striped beneath with black; hind tibiae black at the base. Tarsi yellow, tips black. Wings cinereous; squamulae yellow; veins black; ulna about as long as the humerus. (Walker.)

Mr Walker says: "Perhaps a variety of *C. inclinator*, a native of Ceylon, Celebes and Aru; the black hue predominates a little more on the legs, and the wings are cinereous, not pellucid. The Chinese specimens included with *C. inclinator* belong to *C. obscurator*."

HAB. Hawaii (Koebele); Hilo (H. W. Henshaw), in July.

This species was originally described from Hiogo, Japan. Specimens are also in the U. S. National Museum taken by Koebele in Japan and China. In the Hawaiian Islands Mr Koebele has bred it from a cocoanut Pyralid, *Omiodes blackburni* Butler.

Family LXVI. MISCOGASTERIDAE.

Subfamily III. *MISCOGASTERINAE.*

TOXEUMA Walker.

1833. *Toxeuma* Walker, Ent. Mag. I. pp. 371 and 378.

1. Wings not entirely hyaline, either subfuliginous or with a smoky discoidal cloud ......3.
Wings clear hyaline, without a discoidal cloud ....2.

2. Head and thorax bright gold-green, shagreened with cupreous reflections; coxae and femora metallic, the tibiae and tarsi, except the last joint, pale ferruginous; abdomen bottle-blue, the ♀ with a decided aeneous tinge, especially towards the base..(*1*) *T. hawaiiensis*.
Head and thorax aeneous black, shagreened; coxae aeneous black or submetallic, the front coxae sometimes rufous, the rest of the legs ferruginous; abdomen aeneous black, beneath strongly, triangularly produced towards the base; all funicle joints longer than wide ....(*2*) *T. ferrugineipes*.

3. Wings mostly subfuliginous ....6.
Wings hyaline, with a more or less discoidal cloud, which is sometimes reduced to a small dusky cloud, or spot, just beneath the apex of the stigmal vein............4.

4. Apex of the wings smoky or dusky..5.
Apex of the wings clear, not smoky.
Head and thorax bronzed green, shagreened or feebly shagreened, the thorax at sides and beneath sometimes differently coloured.
Coxae aeneous black, the femora brown-black, the trochanters, tibiae and tarsi, except the last joint, brownish-yellow; abdomen aeneous black, strongly triangularly produced towards base beneath; funicle joints wider than long...(*3*) *T. affinis.*
Coxae and femora metallic, the middle and posterior tibiae usually fuscous, the knees and the anterior tibiae (sometimes middle tibiae) honey-yellow, or brownish-yellow; funicle joints subquadrate, 2 to 4 wider than long ....(*4*) *T. tarsata.*

5. Head and thorax bright bronzed green; abdomen and legs aeneous-black, a dot on the knees and all tarsi, except the last joint, light brown or brownish-yellow ....(*5*) *T. nubilipennis.*

6. Blue-black, polished; tarsi honey-yellow; a space at basal third of the wings, extending narrowly beneath the marginal vein and the triangular space formed by the postmarginal and the stigmal veins, hyaline..............(*6*) *T. nigrocyanea.*

(1) *Toxeuma hawaiiensis*, sp. nov.

♀. Length 2·8 to 3 mm. Head and thorax gold-green, shagreened, the antennae brown-black, the legs metallic, the tibiae and tarsi, except the last joint, pale ferruginous or brownish-yellow, the abdomen bottle-blue or blue-green, while the wings are hyaline with the veins yellowish.

The antennae are 13-jointed with 2 minute ring-joints; the flagellum is subclavate, the first three joints being a little longer than thick, the fourth is scarcely as long as wide, the fifth and sixth distinctly wider than long, while the club is ovate and composed of three closely united joints. The metathorax has a distinct median carina and with lateral carinae bounding the pleura. The marginal and postmarginal veins are long, the former being a little the longer, while the stigmal vein is distinctly clavate and about half the length of the postmarginal. The abdomen is pointed ovate, as long as the head and thorax united, the second segment being much the largest, occupying nearly half the length of the abdomen, or as long as segments 3 to 5 or 6 united, the seventh being usually conically pointed.

♂. Length 2·4 mm. Agrees well with the ♀, except that the anterior and middle femora are brown, that none of the funicle joints are longer than thick, and that the abdomen is oblong-oval, depressed and shorter than the thorax.

HAB. Hawaii: Kilauea, ♂ and ♀ in August; Kona (4000 feet), in July.

(2) *Toxeuma ferrugineipes*, sp. nov.

♀. Length 2·8 mm. Head and thorax aeneous-black, the frons more distinctly metallic, the antennae black, the scape beneath towards base and the legs, except the hind coxae, ferruginous; wings hyaline, the veins brownish-yellow.

The antennae are much longer than in the preceding species (*hawaiiensis*), all the funicle joints being distinctly longer than thick, the first being fully twice as long as thick, the following to the club gradually shortening. The metathorax is slightly produced medially at apex, with a strong, sharp median carina, and has the pleural ridges ciliate with long white hairs. The marginal and postmarginal veins are long, as in the previous species, but the stigmal is somewhat longer, being nearly two-thirds the length of the postmarginal vein. The abdomen, seen from above, is long, conic-ovate, while beneath towards the base it is produced into a large triangular keel.

Hab. Molokai, in mountains (4800 feet), in August.—Hawaii: Kilauea in August.—Maui: Haleakala (7000—10000 feet), in May.

(3) *Toxeuma affinis*, sp. nov.

♀. Length 2·6 mm. Head and thorax above bronzed green, feebly shagreened, the thorax at sides and beneath, the coxae and the abdomen aeneous-black; femora brown-black, the hind pair submetallic, the trochanters, tibiae and tarsi, except last joint, ferruginous or brownish-yellow.

The antennae are shorter than in *T. ferrugineipes*, with all the funicle joints wider than long, cup-shaped. The metathorax has the lateral carinae strongly curved inwardly towards apex, with the median carina short. The wings are hyaline, with a subfuscous cloud beneath the stigmal vein, the veins being dark brown; the postmarginal vein is almost as long as the long marginal, while the stigmal vein is about two-thirds the length of the postmarginal.

♂. Length 1·6 to 1·8 mm. Head and thorax darker than in ♀, or bronzy-black, the abdomen oblong-oval, briefly petiolate, the antennae filiform, the flagellum with long, sparse hairs, the funicle 7-jointed, the joints elliptic-oval, longer than thick, the legs, except the hind coxae, brownish-piceous, the sutures of the joints and the tarsi yellowish; otherwise as in the ♀.

Hab. Kauai (4000 feet), in October.—Lanai (3000 feet), in January.—Molokai Mts. (4500 feet), in September.

(4) *Toxeuma tarsata*, sp. nov.

(Plate VIII. fig. 6, ♀.)

♀. Length 2·5 to 2·9 mm. Head and thorax bronzed green, or strongly metallic green, shagreened; flagellum brown-black, the scape and pedicel smooth, aeneous-black, the coxae and femora metallic or aeneous, the tibiae usually dark brown or fuscous, the knees and the tarsi, except the last joint, honey-yellow or brownish-yellow; sometimes the anterior and the middle tibiae are brownish-yellow; the abdomen varies from a blue-black to an aeneous black; wings hyaline, always with a more or less well defined discoidal cloud beneath the stigmal vein, the veins being light brown or brownish-yellow.

The antennae are 13-jointed, with 2 minute ring-joints, the joints of the flagellum fluted, none of the funicle joints being longer than thick, the 4th, 5th and 6th being wider than long. The postmarginal vein is about two-thirds the length of the long marginal vein, the stigmal vein being more than half the length of the post-marginal. The abdomen is elongate, conically pointed and longer than the head and the thorax united, beneath convex, the second dorsal segment occupying hardly one-third the entire length.

♂. Length 1·5 to 1·8 mm. Head and thorax aeneous-black, the scutellum bronzed green, the flagellum subclavate, pubescent, the funicle joints subquadrate, the abdomen oblong-oval, depressed, not longer than the thorax, the second segment bluish.

Hab. Hawaii; Kilauea, in August.

(5) *Toxeuma nubilipennis*, sp. nov.

♀. Length 2·5 mm. Head and thorax bright bronzed green, shagreened, the antennae black, the legs aeneous-black, a dot on the knees, the extreme tips of tibiae, and all tarsi, except the last joint, light brown or brownish-yellow; wings hyaline, with a large discoidal cloud extending to the hind margin and the tips smoky, the discoidal cloud parted by a longitudinal hyaline streak.

The antennae are somewhat similar to those in *T. tarsata*, but are slightly slenderer, the funicle joints being longer than thick, the first being about 1½ times as long as thick, the following very gradually shortening and widening. The marginal and post-marginal veins are nearly equal in length, the latter extending to the apex of the wing where it tapers off to a fine point; the stigmal vein is about half the length of the marginal. The abdomen is conic-ovate, produced into a point at apex, and fully as long as the head and the thorax united, the second dorsal segment occupying scarcely one-third its entire length; the fifth segment basally and the sixth and seventh, in certain lights, show a distinct brassy tinge.

The species is allied to *T. tarsata*, but may be easily separated by the antennal differences and the colour of the wings.

Hab. Lanai (3000 feet), in January.—Maui: Haleakala (5000 feet), in October.—Kauai (high plateau), in August.

(6) *Toxeuma nigrocyanea*, sp. nov.

♀. Length 2 mm. Uniformly blue-black, polished, and without a metallic tinge, under a strong lens exhibiting at the most a feeble alutaceous sculpture ; the anterior tibiae beneath and at apex and all tarsi, except the last joint, are honey-yellow or light brown ; wings subfuliginous, with their basal third and a streak beneath the marginal vein hyaline, the veins being brown.

The head in the ♀ is lost and the antennal characteristics cannot be given. The abdomen is conic-ovate as in the previous species (*T. nubilipennis*).

♂. Length 1·5 to 1·6 mm. Blue-black, with the tarsi light brown, the flagellum brown-black, the funicle joints submoniliform and subpedunculated, a little wider than long, while the abdomen is oval, depressed, and much shorter than the thorax.

Hab. Lanai (2000 feet), in January.

Stictomischus Thomson.

1878. *Stictomischus* Thomson, Hym. Skand., iv. pp. 220 & 234.

(1) *Stictomischus haleakalae*, sp. nov.

♂. Length 2·8 mm. Dull bronzed green, shagreened, the sculpture of the middle and lateral lobes of the mesonotum anteriorly transversely wrinkled ; the sides of the thorax and beneath, the legs, except the anterior tarsi which are honey-yellow and the tibial spurs which are whitish, and the abdomen aeneous-black. The antennae are filiform, the scape and pedicel shining black, the flagellum dull, brown-black, pilose, the first joint of the funicle being much the longest joint, a little thicker at apex than at base and about four times as long as thick, while the following joints to the club are subcylindrical, nearly equal in length, hardly thrice as long as thick. The wings are subfuscous, the veins brown, the marginal and postmarginal veins longer than the stigmal vein, the latter ending in a large knob. Abdomen oblong oval, depressed, much shorter than the thorax.

Hab. Maui : Haleakala (5000 feet), March 20, 1894.

Subfamily IV. *LELAPINAE.*

This group, up to the present time, has been represented by a single genus, *Lelaps* Haliday, well represented in the West Indies and in South America.

Dr von Dalla Torre, in his Catalogus Hymenopterorum, Vol. v. 1898, has unwarrantably changed Lelaps into *Laelaps*, a name already employed in the Reptilia and the Arachnida. The original spelling of the genus is here retained, and since two new genera allied to it have been recognized in the Hawaiian fauna, I have concluded to give here a synopsis of the genera now known to me.

Males ....4.

Females.

1. Antennae 12 or 13-jointed, the last joint of the club so minute as to be often confused with the penultimate joint ....3.

Antennae 14-jointed, with 2 ring-joints.

Winged forms ....2.

Wingless forms.

Abdomen conically pointed, the petiole distinct, a little longer than thick, the second segment occupying hardly half of its surface; flagellum rather stout, subclavate, the joints fluted. [United States.] ....(*1*) APTEROLELAPS n. g.

(Type *A. nigriceps* Ashm. MS.)

2. Abdomen conically produced at apex and usually ending in a prominent ovipositor; second segment large, occupying fully half of the surface, the third to fifth very short, the sixth and seventh together conical, longer than half the length of the second. [West Indies, South America.] ....(*2*) *Lelaps* Haliday.

3. Abdomen conically produced at apex, the second segment not much longer than 3 and 4 united, the fifth longer than the fourth, the seventh conically produced; scutellum with a cross-furrow at its apical third. [Hawaii.] ....(*3*) NEOLELAPS n.g.

(Type *N. hawaiiensis* Ashm.)

Abdomen subglobose or short oval, the second segment very large, occupying nearly the whole surface, the following very short, more or less retracted within the second; scutellum with a cross-furrow very near its apex, far beyond its apical third. [Hawaii.] ....(*4*) MESOLELAPS, n. g.

(Type *M. cyaneiventris* Ashm.)

4. Petiole of abdomen long, the body small, spatulate; antennae very long, 14-jointed, longer than the whole body, the joints long, cylindrical, clothed with long hairs ....(*2*) LELAPS Haliday.

Petiole of abdomen very short, the body oblong-oval, truncate at apex; antennae not longer than the thorax, 13-jointed, the flagellum filiform, pubescent, the joints after the first about twice as long as thick ....(*4*) MESOLELAPS n. g.

The males belonging to *Apterolelaps* and *Neolelaps* are unknown, and cannot be incorporated in the table.

NEOLELAPS, gen. nov.

The salient characters for the recognition of this genus have been brought out in the table of genera given above, and little more can be said of it: The shape of the abdomen is very similar to that of *Lelaps* and especially to some undescribed species in my collection from South America, but the much shorter second segment, and the differences noted in the antennae readily separate the two genera. In its antennal characters it comes quite close to *Mesolelaps*, but in all other respects it is totally different, the abdomen in the last mentioned being subglobose or short oval, never conically produced at apex, and has the second dorsal segment very large, occupying nearly the whole surface of the abdomen.

(1) *Neolelaps hawaiiensis*, sp. nov.

(Plate VIII. fig. 7, ♀.)

♀. Length 6 to 6·2 mm. Head and thorax bronzed green, shagreened, the abdomen metallic brown, the eyes brown. Scape of antennae, the tegulae and the legs, except the coxae, yellow, while the veins of the wings, except the subcostal vein and the knob of the stigmal vein, which are brown, are pallid.

The antennae are long, the joints of the funicle being long and cylindrical, but gradually shortening to the club, the first joint being not quite five times as long as thick, the last about thrice as long as thick. The abdomen is produced at apex, the 7th and 8th segments forming a spike-like process which is nearly as long as the rest of the abdomen.

Hab. Kauai (high plateau). Taken in August 1894.

(2) *Neolelaps flavipes*, sp. nov.

♀. Length 2·9 mm. Head and thorax bronzed green, shagreened, the abdomen aeneous-black; scape of antennae, the tegulae, and the legs, except the coxae, brownish-yellow, the flagellum brown.

The antennae are 13-jointed, with 2 ring-joints, the joints of the flagellum all distinctly fluted, the funicle joints in outline nearly oval, longer than thick. The scutellum is divided by a strong punctate line towards apex and by a punctate line from the postscutellum. The metathorax is produced into a small globose neck at apex, the metanotum being biareolated, the sides fimbriate with white hairs, the spiracles oval. The abdomen is acutely conically produced at apex and is attached by a very short petiole to the under surface of the globose neck of the metathorax, the second segment being large and occupying fully one-third of the whole surface of the abdomen.

Hab. Kauai: Koholuamo, in April. One ♀ specimen.

Mesolelaps, gen. nov.

Differs from all the other genera included here by the shape of the abdomen, which is subglobose or short oval, never conically produced at apex, and by the very large second segment which occupies most of its surface, the following segments being very short and more or less retracted, while the cross-furrow of the scutellum is much nearer the tip than in *Lelaps* or *Neolelaps*.

(1) *Mesolelaps cyaneiventris*, sp. nov.

(Plate VIII. fig. 8, ♀.)

♀. Length 2·8 to 3 mm. Head and thorax variable from a bronzed green to a metallic or blue-green, and both shagreened, with the posterior margin of the mesopleura and the metapleura smooth and more or less cupreous; antennae black; legs brown-yellow, the coxae metallic, the hind tarsi more or less fuscous; abdomen blue-black, with an aeneous tinge in certain lights; wings hyaline, the tegulae and veins yellowish. The flagellum is subclavate, the joints being fluted, the first the longest, about twice as long as thick, the following gradually shortening, the last funicle joint being only a little longer than thick.

♂. Length 2 mm. Blue to bluish-green, the head and thorax above usually bright metallic green; abdomen, coxae and femora dark blue, the tibiae and tarsi brownish-yellow; the flagellum filiform, clothed with a short pubescence, the funicle 7-jointed, the first joint the longest, nearly 2½ times as long as thick at apex, the following gradually shortening, the seventh joint being only a little longer than thick.

Hab. Hawaii: Kilauea; Kona, taken in August, September and November; Olaa, in November.

Family LXVIII. ENCYRTIDAE.

Subfamily I. *EUPELMINAE.*

Solindenia Cameron.

1883. *Solindenia* Cameron, Trans. Ent. Soc. London, p. 189.

(1) *Solindenia picticornis* Cameron.

1883. *Solindenia picticornis* Cameron, Trans. Ent. Soc. London, p. 189. ♀.
1898. Dalla Torre, Cat. Hym., v. p. 271.

♀. Length between 3 and 4 mm. Reddish-brown, faintly pubescent, the vertex of the head brown or blackish, the face below the antennae, the cheeks, the temples, the prothorax, the mesopleura posteriorly and the sternum, brownish-yellow, the mesonotum just in front of the scutellum bluish, the metanotum with a violaceous tinge; abdomen at basal third and funicle joints of antennae 3 to 6, the anterior coxae, all trochanters, and the middle and hind tarsi, white; rest of legs yellowish, except that the anterior tibiae outwardly, or at apex, and their tarsi, more or less, are subfuscous; the scape, pedicel, two first joints of funicle and the club are brown or fuscous. Wings abbreviated, shorter than the abdomen, and fuliginous from the apex of the subcostal vein, with an oblique, more or less cuneiform-shaped white spot beneath the marginal vein and extending to the base of the stigmal, and another *vis-à-vis* on the hind margin of the wing.

Hab. Oahu: Honolulu, in October.—Hawaii: Kona Mts. (1500 feet), in January.

EUPELMINUS Dalla Torre.

1840. *Urocryptus* Westwood, Intro. Mod. Class. Ins., II. Synop., p. 72.
1897. *Eupelminus* Dalla Torre, Wien. ent. Zeit., XVI. p. 85.

(1) *Eupelminus subapterus*, sp. nov.

♀. Length 2·8 mm. Brownish-yellow, the head above submetallic brown, the apical third of the abdomen or more, especially above, bronzed; flagellum subclavate, black, the pedicel yellowish; wings much abbreviated, fuscous, with pale margins and extending only slightly beyond the base of the abdomen; apex of the hind tibiae and their tarsi basally, white.

HAB. Oahu: Waianae Mountains (3000 feet), in April. "Beaten from trees. Perkins."

EUPELMUS Dalman.

1820. *Eupelmus* Dalman, Svensk. Vet. Ak. Handl., XLI. p. 377.

Males .... 9.

Females .... 1.

1. Head and thorax metallic, peacock, emerald, gold-green or blue-green.

Head, thorax and abdomen black, with a faint metallic or aeneous tinge in certain lights.

Legs black, the anterior and middle tarsi brownish-yellow, the hind tarsi and the middle tibial spur dark fuscous or black, the other tibial spurs pale; hypopygium with a spined process medially at apex; ovipositor about the length of the hind tarsi, black .... *(1) E. niger.*

2. Legs, except sometimes the front and hind coxae, ferruginous, testaceous or yellow (rarely with the anterior femora more or less embrowned basally) .... 7.

Legs, except sometimes the middle pair, mostly metallic .... 3.

3. Anterior and middle coxae alone metallic.

Ovipositor much shorter than the abdomen .... 4.

Ovipositor fully as long as the abdomen, angularly broken a little before the basal third.

Middle legs, all trochanters, tips of their tibiae and their tarsi, the hind femora toward apex, the extreme base of the tibiae, their apices and their tarsi basally, brownish-yellow .... *(2) E. konae.*

4. Scape beneath brownish .... 6.

Scape wholly metallic, not brownish beneath .... 5.

5. Head and thorax bright emerald-green, the abdomen above blue-green.

Abdomen shorter than the head and thorax united; ovipositor fuscous, shorter than the hind tarsi; middle legs, all trochanters, anterior tibiae, except outwardly medially, apex of hind femora, base and apex of hind tibiae and all tarsi, except the last joint of the anterior and middle tarsi and the last two joints of the hind tarsi, brownish-yellow ....(*3*) *E. splendissimus.*

Head and thorax metallic green, peacock or blue-green.

Abdomen longer than the head and thorax united, not strongly punctate; ovipositor variable in colour and length, usually a little shorter than the hind tarsi, rarely as long; middle legs, sutures of trochanters (sometimes wholly), knees, more or less, extreme apex of tibiae, extreme base of the anterior and hind tarsi, and the middle tarsi, except the last joint and the teeth, brownish-yellow ....(*4*) *E. vulgaris.*

6. Gold-green.

Abdomen much longer than the head and thorax united, closely uniformly punctate, except at the extreme base, where it is smooth; ovipositor fuscous, as long or a little longer than the hind tarsus; legs mostly brownish-yellow, the anterior and hind coxae and the hind femora, except at tips, metallic, the front and hind tibiae more or less, and apical joints of tarsi embrowned.......................................(*5*) *E. molokaiensis.*

7. Ovipositor rarely much shorter than the hind tarsi ....8.

Ovipositor much shorter than the hind tarsi, not longer than the basal joint.

All coxae, legs, and scape of antennae, yellow; head aeneous-black, impunctate; thorax and abdomen metallic green ....(*6*) *E. xanthopus.*

Anterior and hind coxae metallic, rest of legs testaceous, the scape aeneous; head blue-green, sculptured; posterior half of the mesopleura and the abdomen cupreous ....(*7*) *E. hawaiiensis.*

8. Body metallic green but variable, the head frequently blue-green or aeneous-black; ovipositor variable in size and colour, fuscous at base and apex and yellowish medially (typical) or wholly fuscous or yellowish, or fuscous only at the base ....(*8*) *E. flavipes.*

9. Metallic green to dark blue-green.

Dark blue-green, the legs metallic, the tibial spurs and the extreme base of first joint of middle and hind tarsi, yellowish-white, with sometimes one or two of the following joints pale beneath, the anterior tarsi more or less yellowish or whitish ....(*4*) *E. vulgaris.*

Metallic green, the legs, except the coxae, brownish-yellow ......(*8*) *E. flavipes.*

(1) *Eupelmus niger*, sp. nov.

♀. Length 5 mm.; ovipositor the length of the hind tarsi. Robust, black; mandibles toward base rufous, the anterior and middle tarsi, and anterior and hind tibial spurs brownish-yellow, the hind tarsi dark fuscous, with a pale ring at base, the middle tibial spur black; wings subhyaline, clear hyaline at extreme base.

The head is finely shagreened, the cheeks with a few sparse punctures, the eyes rather strongly converging above so that the vertex is only half as wide as the face anteriorly. Antennae slightly thickened toward apex, the scape long, aeneous-black, the flagellum opaque, brown-black, clothed with a fine, short pubescence, the first three joints of the flagellum rather long, subequal, the following gradually shortening so that the joint before the ovate club is quadrate or nearly, about half the length of the first. The abdomen is pointed ovate, one-third longer than the head and thorax united, depressed above, strongly carinate beneath, the hypopygium terminating in a spined process the length of the longer spur of the hind tibiae; the whole surface is delicately reticulated from microscopic lines.

HAB. Maui: Lahaina. One a specimen taken in January.

(2) *Eupelmus konae*, sp. nov.

♀. Length 5 to 6 mm.; ovipositor as long as or a little longer than the abdomen and angularly broken a little before the basal third. Metallic green, shagreened; mandibles piceous, with a rufous tinge medially; all trochanters, the middle legs, the apices of anterior and hind femora and tibiae, as well as the base of their tibiae and the tarsi, brownish-yellow, the tibial spurs and basis of middle and hind tarsi whitish, the coxae and rest of legs metallic; wings hyaline, the veins brown.

The head is transverse, as seen from in front a little wider than long, the eyes convergent above, the vertex being only two-thirds as wide as the width of the face anteriorly. Antennae metallic, the scape green, half as long as the flagellum, the latter aeneous black, clothed with a black pubescence, and very slightly and gradually thickened towards apex, the joints similar to those in *E. niger* except that the joint before the club is hardly so long as wide. The abdomen is elongate, pointed at apex, keeled beneath, delicately and microscopically reticulated, but with the spined process of the hypopygium much shorter than in the previous species.

A single specimen, doubtless only a variety which may be named *rufipes*, has all the legs except the anterior and middle coxae, brownish-yellow.

HAB. Hawaii: Kilauea, in August, and Kona (4000 feet), in August. Described from 5 ♀ specimens.

(3) *Eupelmus splendissimus*, sp. nov.

♀. Length 3·5 mm.; ovipositor very short, shorter than the hind tarsi. Bright emerald green, finely shagreened, the abdomen blue-green, the middle legs, all trochanters, apices of the anterior and hind femora (the latter broadly), and base and apices of their tibiae, as well as tarsi, except the apical joints, pale brownish-yellow;

the anterior and hind coxae and rest of the legs, not specified, are metallic; wings clear hyaline, the venation yellowish.

The head is as in *E. konae*, the eyes converging above. The antennae are aeneous-black, the flagellum subclavate, clothed with a black pubescence, the joint before the club being longer than thick, the first being the longest or much longer than the pedicel. The abdomen is oblong-oval, shorter than the thorax, the apex rounded, not pointed, above depressed, beneath convex, but not carinate.

HAB. Hawaiian Islands. Described from a single specimen, without either a number or locality label.

(4) *Eupelmus vulgaris*, sp. nov.

♀. Length 3 to 4·5 mm.; ovipositor usually much shorter than the hind tarsi. Metallic green, bronzed green to blue-green, closely, finely punctate or shagreened, the legs being being mostly metallic; the middle legs entirely, the trochanters, the knees, tips of tibiae and the tarsi, except apical joints of the front and hind tarsi, are brownish-yellow; wings hyaline or only faintly tinged, the veins light brown.

The general habitus of this species, as well as the shape of the head and the antennae, is as in *E. niger*, except that the abdomen is shorter and less pointed at apex.

♂. Length 3 to 3·5 mm. The head and thorax vary in colour from a bronzed green to a blue-green, and are closely, shallowly punctate or reticulately sculptured. The mesonotum is only slightly depressed and exhibits only faint traces of the parapsidal furrows. The abdomen is usually bluish, but also sometimes aeneous or even metallic green. The flagellum is long, filiform, black, and clothed with a dense black pubescence. The legs are most frequently metallic green or blue, with the extreme tips of the tibiae and the front tarsi, except an annulus at the extreme base, and the tibial spurs whitish.

Described from many specimens representing both sexes.

HAB. Hawaii: Kona (3000 feet), in September, (4000 feet), in August, (2000 feet), in October.—Lanai: Mts. Waimea (4000 feet), in May.—Maui: Haleakala, in April, (5000 feet), in March.—Oahu: Honolulu (2000 feet), in October; Kaala Mts. (1500 feet), in January.—Molokai Mts. (4000 feet), in April and June.

(5) *Eupelmus molokaiensis*, sp. nov.

♀. Length 2·1 mm.; ovipositor a little longer than the hind tarsus. Gold-green, finely, closely punctate and clothed with a whitish pubescence; mandibles dark rufous, with black teeth; scape metallic with the extreme base yellowish; flagellum subclavate, black and pubescent, the joints gradually shortening and widening to the club, the first joint the longest, the joint before the club a little wider than long and a little shorter than the preceding; wings hyaline, the veins yellowish; legs brownish-yellow, with the front and hind coxae and the hind femora, except at tips, metallic, the tibial spurs and the tarsi, except the last joint, whitish, the hind tibiae, except at both ends, embrowned, the anterior femora and tibiae slightly obfuscated medially. The abdomen is elongate, much longer than the head and thorax united, rounded at apex, the ovipositor prominent and of a dark fuscous colour.

Described from a single ♀ specimen taken July 7, 1893. The species is easily distinguished from all others by colour, and the entire surface, including the abdomen, being finely, closely punctate; the abdomen in the other species being smooth or at most microscopically reticulated from delicate lines, but never closely punctate.

HAB. Molokai: Kalae.

(6) *Eupelmus xanthopus*, sp. nov.

♀. Length 1·9 mm.: ovipositor very short, not longer than the basal joint of the hind tarsus, brown. Metallic greenish, the head much darker, aeneous-black, the scutellum and the abdomen bronzed green, the surface being smooth and impunctate, except the scutellum, which is feebly shagreened. Wings hyaline, the veins pale-yellowish. Scape of antennae and the legs straw-yellow, the flagellum black.

HAB. Oahu: Honolulu. One specimen taken in July.

(7) *Eupelmus hawaiiensis*, sp. nov.

♀. Length 3 mm.; ovipositor about the length of the basal joint of hind tarsi, testaceous but narrowly black at base. Robust, gold-green, with bluish and purplish reflections and shagreened, the head bluish-green; antennae black, the scape and pedicel aeneous; first joint of the flagellum is the longest joint, being longer than the pedicel and about twice as long as the last funicle joint. Wings hyaline, the veins light brown; the legs, except the front and hind coxae, which are metallic, wholly testaceous; abdomen a little longer than the head and thorax united.

Type. Cat. No. 5551, U. S. N. M.

HAB. Hawaii. One ♀ specimen taken by Albert Koebele.

(8) *Eupelmus flavipes* Cameron.

1883. *Eupelmus flavipes* Cameron, Trans. Ent. Soc. London, p. 190. ♀.—1894. Dalla Torre, Cat. Hym., v. p. 276.

Length 4 to 5 mm. Green; thorax beneath, the sides above more or less, and abdomen, coppery. Antennae black; scape more or less testaceous beneath. Legs straw-yellow, the femora somewhat darker; posterior and anterior coxae for the most part coppery green; middle pair coppery at extreme base. The antennae are inserted a little below the level of the eyes and become but very slightly thinner towards the apex, and are covered with a microscopic pile; the 2nd joint is a little more than one-half of the length of the third, which is nearly of the same length as the 4th; the 5th distinctly shorter; 6th a little shorter than 5th; the 7th, 8th, and 9th become gradually shorter; the apical a little shorter than the three preceding together, sharply pointed at the apex, and apparently composed of only one joint. The antennae are nearly as long as the abdomen. Head and thorax covered with longish black scattered hairs. Pronotum and metanotum finely punctured. Abdomen shorter than the thorax, depressed in the centre, narrowed at base and apex, the latter rounded. Ovipositor a little longer than the posterior tarsi, testaceous, black at base and apex; apex of middle tibiae distinctly thickened; middle metatarsus thickened, pilose beneath, shorter than the succeeding joints together; the long spur three-fourths of its length. Wings hyaline; cubitus indistinct, pallid yellow; ulna fuscous; costa scarcely pilose. Eyes large, projecting and converging towards the top. (Cameron.)

HAB. Hawaii: Kona (4000 feet).—Kauai (2500 feet), Makaweli.—Lanai (2000 to 2500 feet), in December.—Molokai (3000 feet) in October, Kaala Mts. (3000 feet) in December.—Oahu: Waianae Mts. (2500 feet), in April.

ANASTATUS Motschulsky.

1859. *Anastatus* Motschulsky, Etud. entom., VIII. p. 116.

This genus, which is parasitic in the eggs of various insects and particularly in those belonging to the Rhynchota and Orthoptera, is represented by a single species, as follows:

(1) *Anastatus koebelei*, sp. nov.

♀. Length 3 mm. Metallic green or blue-green, the head in front, the middle lobe of the mesonotum and the scutellum being usually gold-green; head and thorax shagreened, the metapleura smooth bottle-blue; abdomen black or blue-black, with a whitish or yellowish-white band near the base; scape of antennae, the pronotum at the sides, and the legs, except the front and middle coxae, dark rufous, sometimes more or less fuscous; flagellum black. The wings are fuscous, with the basal third and the tips hyaline; the fuscous part of the wings near the middle has two oblique whitish spots, *vis-à-vis*, the first originating at the front margin about the middle of the marginal vein, while the other is opposite this at the hind margin, both converging and almost uniting at the middle of the wing.

Type. Cat. No. 5552, U. S. N. M.

HAB. Hawaii. Described from four ♀ specimens taken by Mr Albert Koebele, and two specimens taken by Mr Perkins, at Kona (1500 feet), in September 1892.

Subfamily II. *ENCYRTINAE.*

Tribe II. *ENCYRTINI.*

ENCYRTUS Latreille.

1809. *Encyrtus* Latreille, Gen. Crust. et Ins., IV. p. 31.

(1) *Encyrtus fuscus* Howard.

1880—81. *Comys fusca* Howard, U. S. Dept. Agric., p. 363, ♀, ♂.—1887. Cresson, Syn. Hym. North America, p. 239.

1887. *Chiloneurus maculatipennis* Provancher, Add. Fn. du Can. Hym., p. 208. ♀.—1898. Dalla Torre, Cat. Hym., V. p. 242.

1900. *Encyrtus fuscus* Ashmead, Proc. U. S. Nat. Mus., XXII. p. 360.

♂. Length 2·6 mm.; expanse of wings 5 mm.; greatest width of fore wing 0·8 mm. Face deeply punctate, yellowish-brown in colour, vertex dusky, cheeks blackish, mouth parts dusky. Scape of antennae and pedicel honey-yellow below, brown above; flagellum blackish, with quite long black hairs. Collar black above, brownish-yellow below; mesoscutum blackish in the middle, ocherous at sides, clothed with many lighter hairs; tegulae ocherous, blackish at tip; scapulae dusky, very thickly and finely punctured; mesoscutellum ocherous, with hairs anteriorly, the tuft being black; metanotum black except postscutellum, which has an ocherous tinge; peduncle black; abdomen shining black. Wings as with *C. bicolor*, the markings, however, being clearer and more distinct, and the veins very black, except at the transverse clear spot; the stigmal vein is more curved than in *bicolor*. Front coxae transparent white, femora, tibiae and tarsi honey-yellow; middle and hind coxae yellowish, blackish at tips; middle femora yellowish, slightly darker above; tibiae almost black, yellowish at tip; spur and tarsi yellow; claws blackish; hind femora and tibiae nearly black; tarsi whitish except last joint.

♀. Similar to the male in all respects except that the colour of the collar, mesoscutum, scapulae, and mesoscutellum is of a uniform clear ochreous. (Howard.)

HAB. Hawaii: Olaa, in November.—Lanai (3000 feet), in February.

Tribe III. *MIRINI.*

BOTHRIOTHORAX Ratzeburg.

1844. *Bothriothorax* Ratzeburg, Ichn. d. Forstins., I. p. 209.

(1) *Bothriothorax insularis* Cameron.

1886. *Encyrtus? insularis* Cameron, Mem. Manchester Lit. and Phil. Soc. (3), X, p. 243.—1894. Dalla Torre, Cat. Hym., V. p. 260.

Dark blue; the antennae, apex of fore femora, apical third of middle and apical half of hind femora, the tibiae and tarsi yellowish testaceous, base of four anterior tibiae fuscous; club of antennae darker than scape; abdomen more or less green. Wings hyaline, nervures testaceous. Head covered with large, distinctly separated punctures; thorax more closely punctured, the punctures being also smaller than those on the head; scutellum closely and more finely punctured than the metanotum; abdomen shining, impunctate. Head and mesothorax finely and sparsely pilose; scutellum densely pilose. Abdomen glabrous.

Scape of antennae longer than the flagellum, the flagellum 7-jointed, the first six broader than long, becoming gradually broader until the sixth is double as wide as long; last joint (forming a club) longer than the preceding six; the apex produced laterally, the elongation forming about one-fourth of the total length, and half the thickness of the central part; the club becomes gradually thickened towards the apex. The flagellum is covered with longish stiff hairs, directed towards the apex. Head broad, rather large; eyes large, converging above; ocelli in a wide triangle, widely separated, the upper two nearly touching the eyes; occiput concave. Face deeply excavated, the excavation reaching laterally to the mouth; epistoma projecting, broadly keeled. Thorax large, broad, without sutures; scutellum large; metathorax small. Abdomen shorter than the thorax, the apex narrowed, transverse. Wings scarcely as long as the body; cubitus more than double the length of the ulna, which is very short; radius absent; edge of wing shortly ciliated. The cubitus does not reach to the middle of the wing. Hind tibiae almost one-spurred, the inner being a mere stump.

The above-described species is certainly not an *Encyrtus* as now understood. I cannot make it fit into any of the genera as defined by Mayr and Foerster; but having only a single example (a male), I do not care to found a new genus for its reception. The sculpture of the head and thorax is pretty much as in *Bothriothorax*. (Cameron.)

There is a *Bothriothorax insularis* Howard, described later from the West Indies; it may be known hereafter as *B. howardii.*

HAB. Hawaiian Islands: taken on several of the islands.

MICROTERYS Thomson.

1875. *Microterys* Thomson, Hym. Skand., IV. p. 155.

(1) *Microterys molokaiensis*, sp. nov.

♂. Length 1·1 mm. Dark bronzed green, the mesopleura still darker, or aeneous black; scape and pedicel black, the flagellum dark brown, the joints elongate oval, clothed with long, sparse hairs; legs fuscous, the tibiae spurs white, the tips of middle tibiae and their tarsi brownish-yellow. Wings hyaline, with an irregular fuscous discoidal cloud beneath the marginal vein, the same connected with a fuscous streak or ray along the hind margin of the wing and interrupted by a clear spot extending below the short stigmal vein.

HAB. Molokai Mts. (3000 feet). Described from a single specimen taken in June 1893.

ADELENCYRTUS Ashmead.

1900. *Adelencyrtus* Ashmead, Proc. U. S. Nat. Mus., XXII, pp. 341, 401.

(1) *Adelencyrtus kaalae*, sp. nov.

♀. Length 1·5 mm. Head variable, from a blue-black to an aeneous-black, with some sparse punctures on the vertex, the scrobes semicircular but not deeply impressed. Head and abdomen aeneous black, smooth and impunctate, the hypopygium brownish. Antennae dark brown, the scape clavate, as long as the pedicel and the flagellum united, the pedicel obconic, scarcely longer than thick at apex, the flagellum short, clavate, all the joints being wider than long. Wings clear hyaline, the veins brownish, the stigmal vein being about as long as the marginal and postmarginal veins united. Legs dark brown or fuscous, the trochanters, the tarsi and the middle legs brownish-yellow.

HAB. Oahu: Kaala Mts. (2000—2500 feet), in December, (3000 feet) in July.

Family LXIX. PTEROMALIDAE.

Subfamily II. *PTEROMALINAE.*

Tribe II. *PTEROMALINI.*

PTEROMALUS Swederus.

1795. *Pteromalus* Swederus, Svensk. Vet.-Ak. Handl., XVI. p. 200.

(1) *Pteromalus fuscitarsis*, sp. nov.

♀. Length 2 mm. Very similar in habitus to *P. puparum* Linnè, the head and thorax bronzed green, shagreened, the abdomen ovate, polished black. Antennae 13-jointed, with 2 ring-joints, dark brown, the extreme base of the scape yellow; funicle joints 1 and 2 subequal, very little longer than thick, cup-shaped, joints 3 to 6 subquadrate, a little wider than long. Legs, except coxae and the hind tarsi, brownish-yellow, the coxae metallic, the hind tarsi fuscous. Metathorax rugulose, with a median carina, the pleural ridge with long white hairs. Wings hyaline, the veins pale yellowish, the marginal vein about twice as long as the stigmal, the latter two-thirds the length of the postmarginal; tegulae piceous black.

Hab. Lanai (3000 feet). Described from a single specimen taken by Mr Perkins in January 1894.

Subfamily III. *SPHEGIGASTERINAE.*

Tomocera Howard.

1881. *Tomocera* Howard, Rep. U.S. Dep. Agric., 1880—81, p. 368.
1883. *Moranila* Cameron, Trans. Ent. Soc. London, p. 188.
1885. *Dilophogaster* Howard, Entom. Amer., II. p. 98.

(1) *Tomocera californica* Howard.

1881. *Tomocera californica* Howard, Rep. U.S. Dept. Agric., 1880—81, p. 368.
♀, ♂.—1898. *Tomocera californica* Dalla Torre, Cat. Hym., v. p. 216.
1883. *Dilophogaster californica* Howard, Entom. Amer., II. p. 98.
1883. *Moranila testaceiceps* Cameron, Trans. Ent. Soc. London, p. 188.
1898. *Moranila testaceipes* Dalla Torre, Cat. Hym., v. p. 160.

♀. Average length of body, 2·1 mm.; average wing expanse, 3·5 mm.; greatest width of fore wing, 0·65 mm. Head with a delicate sculpture; all of the thorax except the scapulae with fine longitudinal punctures above; metascutum and postscutellum with a number of coarse indentations; many stout bristles sparsely scattered over dorsum of thorax. Abdomen subovate, somewhat flattened dorso-ventrally, smooth and shining; first segment very large, but the other five are plainly distinguishable. On each side of the peduncle on the anterior part of the first abdominal segment is a strong tuft of snow-white hairs. Wing veins strong, dark, bristly, the stigmal making a very small angle with the post-marginal. Colour: head, face, scape of antennae, and the under sides of all legs bright mahogany brown; thorax black with a strong metallic lustre on prothorax, tip of scutellum, and scapulae; abdomen bluish-black with a slight brownish patch beneath at base; flagellum of antennae blackish with short dark hairs; border of the eyes at top of the head bluish; front and middle coxae light brown, hind coxae shining blue-black above, brownish below and at tip; all femora blackish above; middle and hind tibiae blackish above, front tarsi yellowish, last joint black; middle tarsi whitish; hind tarsi with first and fifth joints blackish, others yellowish. The centre of the fore wing is occupied by a large dusky circular patch, the inner edge of which is darker than the rest.

♂. Length 1·5 mm. General colour deep metallic blue-black; antennae with the scape yellow-brown, the remaining joints darker; all legs light yellow-brown except hind tibiae, which are blackish. Wings perfectly clear. (Howard.)

HAB. Lanai (3000 feet), in January.—Molokai Mountains (3000 feet), in January and June.—Maui: Haleakala, in March and July.

Although this species was originally described from California as early as 1881, and from the Hawaiian Islands in 1883, it is evidently not indigenous to either fauna, but is probably a species introduced from the Australian fauna.

Subfamily IV. *SPALANGIINAE.*

SPALANGIA Latreille.

1802. *Spalangia* Latreille, Hist. nat. Crust. et Ins., III. p. 227.

(1) *Spalangia hirta* Haliday.

1833. *Spalangia hirta* Haliday, Ent. Mag., I, p. 334. ♀. 1876. Thomson, Hym. Skand., IV. p. 215. 1881. Cameron, Trans. Ent. Soc. London, p. 562.—1898. Dalla Torre, Cat. Hym., V. p. 208.

Capite thoraceque fere totis punctato reticulatis confertim villosis ♀. ("Long. corp. . 14; alarum 2.")

Caput obscure aeneum antice magis attenuatum quam in sequente, totum confertim crasse punctatum et villosum, plaga intermedia frontis tantum laevissima glabra: antennae nigrae quam in illa longiores et minus incrassatae, articulo 3tio parum breviore quam 2do: thorax obscure aeneus: collare, mesothoracis scutum et humeri confertim punctati, scuti tantum margine antico levigato: paraptera et scutellum vage punctata, hoc apice parcius: metathoracis latera rugoso-punctata, scutellum laevissimum marginibus et canalicula media crenatis: squamulae fusco-ferrugineae: alae dilute ferrugineae nervis fuscis: abdomen et pedes ut in sequente. (Haliday.)

HAB. Hawaii: Honolulu (Blackburn). This European species was recorded from Honolulu by Mr Peter Cameron. I have not seen it and it is not in the collections made by Messrs. Perkins and Koebele, although there is another species, represented in both sexes, which is described below as new.

(2) *Spalangia lanaiensis*, sp. nov.

♀. Length 1·8 to 2 mm. Polished black but exhibiting a faint bluish or aeneous tinge in certain lights; it is smooth and impunctate, except a few sparse punctures on the pronotum, the parapsides and at the sides of the scutellum; the tarsi, except the last joint, are honey-yellow or testaceous; the metathorax with a median grooved punctate line, which is forked at base so as to form a small, triangular space; the abdominal petiole is a little more than twice as long as thick, coriaceous and opaque, with three delicate, elevated lines; the body of abdomen is oblong oval and much shorter than the body, while the wings are hyaline, with the veins brownish-yellow.

The antennae are 10-jointed, if the long club be considered to be only one joint, although with a strong lens three indistinct joints may be detected, thus making the antennae 12-jointed; the scape is a little longer than the 7 funicle joints united; the pedicel obconical, as long as the first three funicle joints united; the funicle joints, except the first, are a little wider than long; while the club is oblong, considerably thicker than the funicle and about as long as the last four joints of the funicle united.

♂. Length 1·5 mm. Agrees well with the female, but the few punctures, noted in female, are smaller, less distinct or nearly obsolete; the body of the abdomen is smaller, short oval; while the antennae are somewhat different, the pedicel being a little shorter, the joints of the funicle moniliform, briefly pedicellated, while the club is ovate and scarcely so long as the last three joints of the funicle united.

Hab. Lanai (2000 feet). Described from one male and two females taken in January 1894.

Family LXXI. EULOPHIDAE.

Subfamily I. *ENTEDONINAE.*

Astichus Förster.

1856. *Astichus* Förster, Hym. Stud., II. p. 78.

(1) *Astichus cyaneus*, sp. nov.

♀. Length 1·4 mm. Body and legs, except tarsi, blue; tarsi mostly white, the last joint of all tarsi and the first and second joints of hind tarsi fuscous; antennae black; wings mottled with brown and hyaline spots.

The head, seen from above, is transverse, fully twice as wide as long, from in front, much wider than long, the vertex flat, the face deeply concave for the reception of the antennae, and angulated at each side near the eye. The antennae are 10-jointed and extend to the tegulae, pubescent, with all the joints of the funicle wider than long, the club being cone-shaped. The wings are similar to those in *A. arithmetricus* Förster, but with more brown maculations and brown at tips. The abdomen is ovate, pointed at apex, but scarcely so long as the head and thorax united, depressed above, subangularly carinate beneath toward base, the second segment being the longest, longer than 3 and 4 united, the following short, subequal.

HAB. Lanai (3000 feet). Described from a single specimen taken by Perkins in January 1894.

OMPHALE Haliday.

1833. *Omphale* Haliday, Ent. Mag., III. p. 339.

(1) *Omphale metallicus*, sp. nov.

♀. Length 1·8, 2, to 2·8 mm. Metallic green to blue-green, shagreened, the sides of the thorax and beneath and the legs more of a bronzed green, the tarsi, except the last joint, pale yellowish, the tibial spurs whitish; thorax beneath and the legs, except the tarsi, sometimes aeneous-black; metathorax very short, with a median carina. The abdomen is usually fusiformly pointed, longer than the head and thorax united and usually of a darker colour than the thorax (rarely oval and shorter than the thorax, due probably to the terminal segments being retracted). The wings are hyaline, with the veins brownish-yellow. The antennae are subclavate, the scape and pedicel aeneous-black or metallic, the flagellum brown-black, rather densely pubescent, the funicle 4-jointed, the joints rather stout, a little longer than thick.

♂. Length 0·9 to 1 mm. Very variable in colour, blue-green to bronzed green, but rarely blue-black, the sides of thorax and beneath, and the legs, except tarsi, blue-black, the tarsi, except the last joint, whitish. The flagellum is dark brown, very hairy, with the funicle only 3-jointed, the joints of same being moniliform; otherwise as in female.

Comes near *O. versicolor* Ashm., described from St Vincent, W. I., but differs in colour, and particularly of the legs and antennae.

HAB. Hawaii: Kailua (W. G. Wait), on November 7, 1894; Kilauea, in August; Olaa, in December.—Kauai: Halemanu. Kaala Mts. in December.—Molokai Mts. (3000 feet), in April, June, September and October.—Oahu: Waianae Mountains (3000 feet), in April. Many specimens.

Subfamily II. *APHELININAE.*

COCCOPHAGUS Westwood.

1833. *Coccophagus* Westwood, Lond. and Edinb. Phil. Mag. (3), III. p. 344.

(1) *Coccophagus ochraceus* Howard.

1895. *Coccophagus ochraceus* Howard, Techn. Ser., No. 1, U. S. Dep. Agric. Ent., p. 38.

♀. Length 0·7 mm.; expanse, 1·53 mm.; greatest width of fore wing, 0·3 mm. Differs at once from all other species of the genus in having the general colour ochraceous or dark honey-yellow instead of black. Head and thorax very finely and sparsely punctate, also very delicately shagreened. Normal notal hairs blackish; abdomen smooth. General colour, as stated above, dark ochre yellow. Eyes dusky, ocelli dark red. Antennae yellowish, except pedicel, which is blackish. Mesopleura and terminal segments of abdomen dark brown, nearly black. All legs concolorous with thorax. Wings hyaline, veins uniformly fuscous.

♂. Punctation of notum a trifle more pronounced than with the female, mesonotum appearing slightly rugose; antennae slightly dusky. (Howard.)

Hab. Hawaii: Kilauea, a single specimen taken in August 1896. The species was originally described from Alameda, California, and it has probably been introduced into the Hawaiian Islands.

(2) *Coccophagus lecanii* Fitch.

1858. *Platygaster lecanii* Fitch, Fifth Rep. Ins. New York, p. 25.

1878. *Coccophagus lecanii* Smith (Emily), Amer. Natural., p. 666.—Forbes, Seventh Illinois Rep., p. 129.—1881. Howard, Rep. U. S. Dep. Agric., pp. 357—358.—1894. Howard, J. Linn. Soc. London, xxv. p. 97. 1895.—Howard, Techn. Ser., No. 1, U. S. Dep. Agric., p. 33.—1898. Dalla Torre, Cat. Hym., v., p. 33.

♀. Length, 1 mm.; wing expanse, 2·25 mm.; greatest width of fore wings, 0·42 mm. Antennae as long as the thorax; head, pronotum, and mesonotum finely and sparsely punctate and furnished with short bristles, punctures of mesoscutum arranged in longitudinal rows. Mesonotum also has a fine shagreening. Mesoscutellum and parapsides of mesoscutum very finely shagreened, without large punctures; abdomen smooth. General colour black, shining, tegulae brown; eyes dark reddish-brown; antennae light brown, with darker longitudinal raised lines on flagellar joints. Hairs of thorax whitish, lighter on mesoscutellum. Last half of mesoscutellum and centre of post-scutellum bright lemon-yellow. Wing veins brown. All femora brown or black, sometimes yellowish at either extremity. All tibiae straw-yellow, with the exception of the posterior pair, which have a brown annulus near base; all tarsi straw-yellow with the fifth joint dark brown.

♂. Somewhat smaller than female; antennae longer, club proportionately considerably longer, each of the joints as long as each of the immediately preceding funicle joints. Coloration like that of the female, except that the yellow tip of the mesoscutellum is wanting. (Howard.)

Hab. Hawaii. Two specimens, labelled No. 1117, bred by Mr Albert Koebele.

Subfamily III. *TETRASTICHINAE.*

Tetrastichus Haliday.

1843. *Tetrastichus* Haliday, Trans. Ent. Soc. London, III. p. 297.

(1) *Tetrastichus hagenowii* Ratzeburg.

1852. *Entedon hagenowii* Ratzeburg, Ichn. d. Forstins., III. p. 211, ♀.—1898. Dalla Torre, Cat. Hym., v. p. 38.

♀. Length 1·5 to 1·8 mm. Aeneous-black, with a metallic green or bluish-green lustre in certain lights; the scape of antennae, the pedicel, the legs, including all coxae, except sometimes the anterior coxae basally, and the extreme base of abdomen, pale yellowish; the flagellum light brown, pubescent. Wings hyaline, the veins pale yellowish. Abdomen pointed ovate, the length of the head and thorax united or a little longer, above depressed, beneath convex.

Hab. Hawaii: Kona (2000 feet), in January; Hilo, in June (taken by Mr H. W. Henshaw).—Lanai: (2000 feet), one ♀ in July.

This species is a hyperparasite on *Evania appendigaster* Linné, which lives in the egg-cases of cockroaches.

Subfamily IV. *ELACHISTINAE.*

Ophelinus Haliday.

1843. *Ophelinus* Haliday, Trans. Ent. Soc. London, III. p. 300.

(1) *Ophelinus mauiensis*, sp. nov.

♀. Length 3 to 3·5 mm. Dark bronzed green, finely shagreened; the scape and pedicel aeneous-black, the flagellum opaque black, pubescent; legs, except coxae, pale brownish-yellow, the femora above toward base, the hind tibiae outwardly toward apex and the three basal joints of hind tarsi outwardly faintly dusky or obfuscated. Wings subhyaline, being faintly tinged with brown, the stigmal vein with a fuscous streak beneath its knob. Metathorax with a median carina. Abdomen elongate, fusiformly pointed, much longer than the head and thorax united, or fully twice as long as the thorax. The antennae are 8-jointed, the pedicel obconical, a little longer than thick at apex; funicle 3-jointed, the joints elongate, the first and second subequal, the first very slightly the longer, about thrice as long as thick, the third twice, or a little more, longer than thick; while the club is 3-jointed, the last joint being very minute.

♂. Length, 2 mm. Differs from the female in having all the legs, except the tarsi, which are fuscous, bronzed or metallic black, the funicle being 4-jointed, the first joint being nearly as long as the second and third united, the fourth moniliform, the club 2-jointed, while the abdomen is oblong, not longer than the thorax and concave above; otherwise it is similar to the female.

Hab. Maui: Haleakala (5000 feet), in March and October.

(2) *Ophelinus hawaiiensis*, sp. nov.

♀. Length, 3·4 mm. Agrees very closely, in shape and structure, with *O. mauiensis*, except that it is of a metallic blue-green, the wings being clearer, nearly hyaline, without the fuscous streak, beneath the knob of stigmal vein, while the scape and the legs, except the coxae, are wholly brownish-yellow.

Hab. Hawaii: Kilauea. Described from one female taken in August 1896.

Subfamily V. *EULOPHINAE.*

Hemiptarsenus Westwood.

1833. *Hemiptarsenus* Westwood, Mag. Nat. Hist., vi. p. 122.

(1) *Hemiptarsenus hawaiiensis*, sp. nov.

♀. Length 2 mm. Aeneous black and feebly shagreened, the mandible rufous, the scape of the antennae and the legs, except the hind coxae, brownish-yellow; flagellum brown-black, sparsely pubescent. Wings hyaline, the veins yellowish; a faint dusky cloud just beneath the knob of the stigmal vein.

The scape is long and extends considerably above the ocelli; the pedicel is obconical, scarcely longer than thick; the funicle is 4-jointed, the first joint being the longest, about thrice as long as thick, the fourth being only about twice as long as thick; while the club is cone-shaped and scarcely so long as the first joint of the funicle. The wings are normal, the marginal vein in the front wings being very long, somewhat longer than the subcostal, the stigmal vein very short, ending in a small knob, with an uncus, while the postmarginal vein is more than twice the length of the stigmal vein with its knob. The abdomen is oval and hardly as long as the thorax.

HAB. Hawaii: Kona (4000 feet). Described from a single specimen taken in August, 1892.

NECREMNUS Thomson.

1878. *Necremnus* Thomson, Hym. Skand., v. p. 234.

(1) *Necremnus maculatipennis*, sp. nov.

♀. Length 2 mm. Aeneous-black, coriaceous, the wings maculate with irregular brown spots, the large discoidal spot beneath marginal vein having a hyaline space between the base of the marginal vein and the origin of the stigmal vein, the apex of the wing with three submarginal spots. The fourth joint of the antennae and the legs, except the hind coxae, are light brownish-yellow. Abdomen ovate, not longer than the thorax.

♂. Length 1·8 mm. Agrees well with the female, except that the flagellum is longer, the joints of the funicle being longer and slenderer, while the abdomen is oblong-oval, shorter than the thorax, concave above.

HAB. Maui: Haleakala (5000 feet). Described from one male and two female specimens taken in March 1894.

SYMPIESIS Förster.

1856. *Sympiesis* Förster, Hym. Stud., II. p. 74.

(1) *Sympiesis konae*, sp. nov.

♀. Length 2 mm. Metallic blue-black, the surface smooth and shining but under a strong lens exhibiting microscopic reticulate lines. The antennae are black, the flagellum subclavate, compressed, the funicle 3-jointed, the first joint the longest, seen from its flat side about twice as long as wide, the second joint a little longer than wide, the third not longer than wide; club 3-jointed. Legs, except the middle and hind coxae, clear yellow. Wings clear hyaline, the veins light brownish. Abdomen pointed ovate, about as long as, or a little longer than, the head and thorax united.

HAB. Hawaii: Kona (2500 feet). Described from a single female taken in September 1892.

EULOPHUS Geoffroy.

1762. *Eulophus* Geoffroy, Hist. abr. Insect., II. p. 312.

(1) *Eulophus citripes*, sp. nov.

♀. Length 1·4 mm. Metallic brown-black, feebly shagreened, the flagellum dark brown, pubescent, the pedicel and the funicle joints beneath and toward apex yellow; mouth parts pale brownish-yellow. Wings clear hyaline, the veins light brownish; the knob of the stigmal vein with a faint fuscous streak beneath. Legs, except the middle and hind coxae, lemon-yellow. Abdomen pointed ovate, longer than the head and thorax united.

HAB. Hawaii: Kona. Described from one specimen.

Family LXXIII. MYMARIDAE.

Subfamily II. *MYMARINAE.*

Tribe II. *MYMARINI.*

POLYNEMA Haliday.

1833. *Polynema* Haliday, Ent. Mag., I. p. 347.

(1) *Polynema hawaiiensis*, sp. nov.

♂. Length 1·5 mm. Polished black, impunctate; legs rufopiceous, the trochanters, tips of femora, knees, an annulus at base of tibiae and the tarsi, except the hind pair, yellowish. Antennae longer than the body, black or brown-black, with the second joint alone yellowish, the joints of the flagellum elongate, fully four times or more longer than thick. Wings hyaline, longly fringed, the delicate subcostal vein and the punctiform marginal vein piceous black. Head, viewed from above, quadrate; pronotum conical; mesonotum twice as long as wide with two distinct parapsidal furrows extending to the base of the scutellum, the latter subconvex, longer than wide or as long as the metanotum; metanotum smooth, sloping off posteriorly. Abdomen rather small pyriform, polished, the petiole slender and fully as long as the hind coxae.

HAB. Molokai Mountains (4000 feet), in September, 1883.

Superfamily VIII. *ICHNEUMONOIDEA.*

Family LXXIV. EVANIIDAE.

Subfamily I. *EVANIINAE.*

Evania Fabricius.

1775. *Evania Fabricius*, Syst. Ent., p. 345.

Black, the wings hyaline, the stigma and the costal veins black.

Face reticulately punctate, with a slight median carina extending anteriorly from between the insertion of the antennae ....(*1*) *E. sericea* Cameron.

Face smooth impunctate, with a median carina extending posteriorly from between the antennae ....(*2*) *E. appendigaster* Linné.

(1) *Evania sericea*, Cameron.

1883. *Evania sericea* Cameron, Trans. Ent. Soc. London, p. 191, ♀.— 1889. Schletterer, Ann. Naturh. Hofm., IV. p. 167.

♀. Length 7 mm. Black; palpi, knees, anterior tibiae, and tarsi obscurely fuscous. Head and thorax coarsely rugose; petiole longitudinally rugose, smoother at the base; mesopleura in front smooth, shining, impunctate, behind coarsely reticulated; breast covered with large shallow punctures. Coxae finely rugose, smooth at base. Posterior femora not much longer than thorax; tibiae and tarsi armed with short thick bristles; tarsi not much longer than tibiae; claws apparently simple. The head, thorax, and legs at the base are closely covered with a white velvety pubescence, which is longest at the sides. Abdomen smooth, shining, compressed, shortly pilose at the sides. Antennae longer than the body; the apex of scape brownish. Wings hyaline; cubital and discoidal nervures obsolete from the discoidal cellules, the upper of which is not at all so broad in proportion to the lower as it is in *E. laevigata*; the transverse humeral nervure is interstitial. The mandibles have two short obtuse teeth besides the large apical one.

This species is apparently most nearly allied to *E. tasmanica*, Westw., but the present species has not the face longitudinally striated. (Cameron.)

Hab. Oahu and Hawaii (No. 131). Oahu: Waianae Mts., in March; Honolulu (A. Koebele).—Lanai, in July.—Hawaii: Hilo in July (H. W. Henshaw); Kona (600 feet), in July (Perkins).

(2) *Evania appendigaster* Linné.

1758. *Ichneumon appendigaster* Linné, Syst. Nat., Ed. x. 1.

1889. *Evania appendigaster* Schletterer, Ann. naturhist. Hofmus. iv. p. 136. ♀, ♂. (Full bibliography and synonymy.)

♀, ♂. Length 7 to 8 mm. Black, shining, the head and the thorax above, except a few sparse punctures, are smooth and impunctate; mesopleura anteriorly smooth impunctate, posteriorly along the hind margin crenate, and with a few sparse punctures on its convex disc; metathorax rather coarsely reticulated, the scutellum with a few minute sparse punctures. Wings hyaline, the stigma and costae black, the internal veins brownish or testaceous. Abdomen petiolate, the abdomen strongly compressed, hatchet-shaped, testaceous along the venter, the ovipositor subexserted, visible from above as a short point; body of abdomen in ♂ clavate, compressed.

Hab. Hawaii: Olaa and Hilo, in July (H. W. Henshaw).

Family LXXVI. ICHNEUMONIDAE.

Subfamily II. *CRYPTINAE.*

Tribe III. *HEMITELINI.*

This tribe is represented by three closely allied species, widely distributed in North America, which were evidently introduced into these Islands from importations from California.

Hemiteles Gravenhorst.

1829. *Hemiteles Gravenhorst,* Ich. Eur., ii. p. 780.

(1) *Hemiteles variegatus* Ashmead.

1890. *Hemiteles variegatus* Ashmead, Proc. U. S. Nat. Mus., xii. p. 398.

♀. Length, 2·4 mm.; ovipositor, 0·4 mm. Brownish-yellow, varied with black, minutely shagreened and opaque; the head is large, transverse, wider than the thorax, the stemmaticum blackish; antennae 18—20-jointed; thorax without parapsidal grooves, and with three black blotches posteriorly; metathorax areolated, the disk black; petiole more or less black, a blotch on disk of second and third abdominal segments sometimes, and the following segments entirely, black. Wings hyaline, the front wings with two transverse fuscous bands. Metathorax areolated, the areola hexagonal, a little wider than long, the basal area very short transverse.

Hab. Hawaii. One female specimen taken by Koebele.

(2) *Hemiteles tenellus* Say.

1835. *Cryptus tenellus* Say, Journ. Bost. Soc. Nat. Hist., I. p. 233, ♀.—1859. Leconte's Ed. Say's Works, II. p. 690. ♀.

1869. *Hemiteles tenellus* Walsh, Can. Ent., II. p. 12, ♀.—1887. Cresson, Syn. Hym. North Am., p. 161.

♀. Length nearly three-tenths of an inch. Honey-yellow; wings banded. Antennae blackish towards the tip: wings hyaline; a fuliginous band before the middle, and a much dilated or double one beyond the middle including the stigma; stigma triangular, and with the nervures brown; radial cellule wide; second cubital somewhat rounded, the exterior nervure wanting; apical nervure obsolete: metathorax beneath the scutel and the insertion of the abdomen black: abdomen arcuated, blackish at tip: oviduct half as long as the abdomen. (Say.)

HAB. Hawaii: Kilauea, in September.

(3) *Hemiteles melitaeae* Ashmead.

1890. *Hemiteles melitaeae* Ashmead, Proc. U. S. Nat. Mus., XII. p. 398, ♀.

♀. Length, 5 mm.; ovipositor, 1 mm. Yellowish-brown, shagreened, opaque; the thorax has three black streaks posteriorly; the metathorax above basally, a median line on the posterior face, streak on petiole and the terminal abdominal segments, are more or less black. Antennae 23-jointed, filiform, the first three joints of the flagellum being long, subequal; thorax without parapsidal grooves; metathorax areolated, the spiracles small, round. Wings hyaline, with two transverse smoky bands, the first across the basal nervure, the other taking in the upper two-thirds of the stigma and all of the marginal cell, the marginal cell, however, has a clear space next to the stigma, and there are also two or three small clear dots in the areolet; the stigma and veins are black, except a spot at base of stigma, the median and submedian veins, the first recurrent nervure and the portion of the cubitus in the clear space between the bands, are yellowish; the cubitus is not broken by a stump of a vein near its middle; hind wings clear hyaline.

HAB. Hawaii: Kilauea.

Subfamily III. *PIMPLINAE.*

Tribe III. *LISSONOTINI.*

LISSONOTA Gravenhorst.

1829. *Lissonota* Gravenhorst, Ichn. Eur., III. p. 30.

(1) *Lissonota bellator* Gravenhorst.

1829. *Lissonota bellator* Grav. *loc. cit. supra*, p. 106.

♀. Length 7 mm.; ovipositor longer than the body. Black; the mandibles medially, the flagellum, the legs, the apical third, or more, of the first segment of abdomen, abdominal segments three and four and base of fourth, and the venter, except at apex, rufous; wings subfuscous, the stigma brown, the areolet triangular, sessile.

Hab. Oahu. A single specimen of this European species is in the collection labelled: "Probably from Oahu. May be British."

Tribe IV. *PIMPLINI.*

Echthromorpha Holmgren.

1868. *Echthromorpha* Holmgren, Eugen. Resa, Zool., I. p. 406.

1892. *Stagmopimpla* Saussure, Grandidier's Hist. de Madagascar, XX. Hym., pl. XVI. f. 1.

1894. *Rhynchopimpla* Kriechbaumer, Berl. Ent. Zeit., XXXIX. p. 51. ♀.

1894. *Polyamma* Kriechbaumer, *loc. cit.*, p. 304. ♂.

The type of this genus, *E. maculipennis* Holmgren, was described from Hawaii. It is one of the commonest species and is found on most of the Islands.

The genus is, however, evidently of Australian origin. Two species have been discovered in the Hawaiian fauna, separable as follows:

Males .... 2.

Females.

1. Black, the front wings with a black spot near apex.
    Orbits black; legs, except more or less of the anterior femora, and tibiae, and the abdomen wholly black .... (*1*) *E. maculipennis.*
    Anterior orbits more or less yellowish; anterior and middle legs more or less rufous, the two or three terminal abdominal segments rufous .... (*2*) *E. flavo-orbitalis.*
2. Face below the insertion of the antennae black, the anterior margin of clypeus alone yellowish; anterior legs in part alone rufous .... (*2*) *E. maculipennis.*
    Face below the insertion of the antennae, the apex of the clypeus and the anterior legs, yellowish .... (*2*) *E. flavo-orbitalis.*

(1) *Echthromorpha maculipennis* Holmgren.

1868. *Echthromorpha maculipennis* Holmgren, Eugen. Resa, Zool. VI. p. 406; tab. VIII. f. 3.

♀. Length 12 to 16 mm.; ovipositor about half the length of the abdomen, or a little less. Black, punctate, the abdomen, except the first segment which is smooth and shining, closer and more strongly punctate, the scutellum convexly elevated, nearly smooth, the postscutellum smooth, impunctate, but with two foveolae, the posterior face of the metathorax polished, impunctate, but with some faint, transverse aciculations towards sides, towards the base and the pleura strongly punctate. Mandibles toward base and the anterior femora beneath and toward apex, their tibiae and tips of tarsal joints rufous; rest of legs black. The head is transverse, thin antero-posteriorly, the temples being flat, not developed, the face above the insertion of the antennae concave, the basin being smooth, except some faint aciculations or wrinkles; below the antennae the face is feebly convex, sparsely punctate but shining; the clypeus is large, smooth, the labrum slightly exposed, yellowish; palpi yellowish; ocelli pale. The wings are hyaline, with a small black spot almost at the extreme apex of the front wings, the stigma and veins black, except the longitudinal veins at their origin, which are testaceous. The abdomen is similar to that in *Pimpla* (sens. str.), the dorsal segments 2 to 6 with a transverse impressed line at apex, which is more or less obsolete medially, and with segments 2 to 5 also with an oblique line on each side extending from the base to the apical transverse line, the apical portion of the segments beyond this line being smooth.

♂. Length 7 to 14 mm. Agrees in every respect with the female, except that it is smoother, feebly, sparsely punctate, the antennae longer, the abdomen elongate, slender, the first and second segments polished, impunctate, while the following segments are also polished but with some sparse, feeble punctures.

HAB. Hawaii: Hilo; Kona (4000 feet), in August; Olaa (2600 feet), in May and September; Kilauea, in September.—Kauai (high plateau), in September.—Lanai: Kaala Mountains (2000 feet), in July.—Maui: Jao Valley, in April.—Molokai, in the Mountains.—Oahu: Waianae Mts., in March; Kaala Mts. (2000 feet) in July.

This species has been bred by Mr Albert Koebele from a geometrid larva infesting cocoanut palms, identified by Dr H. G. Dyar as *Omiodes blackburni* Butler.

(2) *Echthromorpha flavo-orbitalis* Cameron.

1886. *Echthromorpha flavo-orbitalis* Cameron, Proc. & Mem. Manchester Lit. & Phil. Soc. (3), x. p. 239, ♀.

♂. Length 8 mm. "This species differs from *E. maculipennis* as follows:—The face is entirely yellow, the eyes are narrowly bordered with yellow except at the top, the scape beneath, and the anterior coxae and trochanters, the basal half of the scutellum, and the postscutellum are yellow; the wings are much darker tinted, the nervures and stigma are quite black; the metanotum is more strongly punctured, and the oblong depression found near the base in *E. maculipennis* is absent; the punctuation on the abdomen is stronger, there being also a distinct punctuation on the second segment, and the transverse impressions are more conspicuous. Possibly an examination of a large series of specimens may prove that *E. flavo-orbitalis* is only a variety of *E. maculipennis*. (Cameron.)

♀. Length 9 to 16 mm. Differs from female of *E. maculipennis* in having the scape of the antennae, the apex of the clypeus, the anterior and middle legs, except coxae, and the abdominal segments 7 to 8 rufous.

HAB. Hawaii: Hilo in July (H. W. Henshaw).—Molokai, in mountains (4500 to 5000 feet), in June (Perkins).

GLYPTOGASTRA Ashmead.

1900. *Glyptogastra* Ashmead, Proc. U. S. Nat. Mus., XXIII. p. 57.

(1) *Glyptogastra hawaiiensis*, sp. nov.

♀, ♂. Length 7 to 13 mm. Entirely black, except that the anterior femora and tibiae *beneath* are ferruginous. The head and thorax are coriaceous and finely punctate; ocelli transparent, pale amber coloured; wings smoky black, with a faint violaceous tinge in certain lights. The head is transverse, with the temples very flat, not developed, the face above the insertion of the antennae concave, with some fine transverse striae in the basin. The clypeus is distinctly separated from the face, nearly smooth, subopaque, with a few punctures toward the base, the anterior margin being slightly arcuate, not impressed. The antennae are nearly as long as the body, in female 31-jointed, in male 32-jointed, the first joint of the flagellum being much the longest, nearly eight times as long as thick, the following to the last gradually shortening, the last joint about twice as long as the antepenultimate. The scutellum and the postscutellum have deep, broad furrows at the sides, the former being connected with the mesonotum by strong, elevated carinae at the sides anteriorly and has a furrow or depression across the base. The metathorax has a shallow median furrow which broadens into a triangular depression at apex, the triangular space thus formed with some faint, oblique lines. The abdomen is elongate, shaped as in *Pimpla*, the surface finely, microscopically reticulated, the first segment with a hump-like elevation at its apical third, segments 2 to 5 with oblique impressed lines laterally, and segments 2 to 4 with also indications of a transverse line at or near their apices, the line more distinctly impressed laterally. Ovipositor prominent, about half the length of the abdomen. The venation of the wings is similar to *Echthromorpha*, only the discoidal nervure is not quite interstitial with the median vein.

HAB. Hawaii: Kilauea, in August; Kona (4000 feet), in September.

PIMPLA Fabricius.

1804. *Pimpla* Fabricius, Syst. Piez., p. 112.

(1) *Pimpla hawaiiensis* Cameron.

1886. *Pimpla hawaiiensis* Cameron, Proc. & Mem. Manchester Lit. & Phil. Soc., (3), x. p. 239, ♀.

♀, ♂. Length 5·5 to 10 mm.; ovipositor less than one-half the length of abdomen. Black; legs red, the anterior tibiae inclining to yellowish in front, the hind tibiae and tarsi black, the extreme base of hind tibiae and a broad band above the middle and the spurs white; the tips of four anterior tarsi black; extreme base of posterior testaceous. Antennae scarcely as long as the thorax and abdomen united, stoutish, tapering towards the apex; inclining to brown on the lower side, covered with microscopic pile. Head as wide as the thorax, shining, impunctate, the face somewhat protuberant, covered sparsely with white hairs; front a little depressed above the antennae; clypeus clearly separated; maxillary palpi testaceous, labial fuscous. Thorax shining, impunctate, the mesonotum sparsely, sternum and metapleurae densely covered with longish white hair; metanotum without any keels, the thoracic spiracles oblong. Abdomen about double the length of the thorax, covered with a longish white pubescence; base of petiole excavated, the middle portion sparsely punctured; apical part shining, impunctate, separated from the part in front by being a little raised. The other segments (except the apical) are closely and rather strongly punctured; the second is longer than broad; the others to the seventh broader than long; the seventh is longer than broad; the eighth is narrowed gradually to the apex. The edges of the second segment are testaceous at base and apex. Wings hyaline, shorter than the thorax and abdomen; the nervures and stigma black; areolet 4-angled, angled on lower side; the lateral nervures uniting at top; the recurrent nervure angled a little above the middle. (Cameron.)

HAB. Hawaii: Hilo in June and July (H. W. Henshaw); Kona (4000 feet), in July; Olaa (1500 feet), in May.—Lanai: Halepaika, in July (2000 feet), in February; Haleakala (3000 feet), in July.—Molokai, in mountains (2500 feet), in July.—Oahu: Honolulu (2000 feet), in March; Kaala Mts. (1500 feet), in February; Waianae Mts., in April.

Subfamily IV. *TRYPHONINAE.*

Tribe IV. *TRYPHONINI.*

METACOELUS Förster.

1868. *Metacoelus* Förster, Verh. d. naturh. Ver. Rheinl., xxv. p. 161.

(1) *Metacoelus femoralis* Fourcroy.

1781. *Ichneumon femoralis* Fourcroy, Ent. Paris, p. 396.
1829. *Exochus femoralis* Gravenhorst, Europ. Ichn., II. p. 346. 1856. Holmgren, Monogr. Tryph. Suec., p. 308.

♀, ♂. Length 5·5 to 7 mm. Black, sparsely pubescent; upper edge of the frontal ledge ferruginous; palpi and tegulae yellowish; antennae brown-black or fuscous, paler beneath; legs incrassated, flavo-ferruginous; wings subhyaline, the costae and the stigma brown-black, the other veins lighter brown. The whole body is shining, the face rather coarsely punctate, the vertex and mesonotum more finely punctate, the scutellum with some sparse, minute punctures, while the pleura and the metathorax are smooth, impunctate, the latter being completely areolated. The abdomen is shining, highly polished, the first segment having two carinae that extend a little beyond the middle of the segment. The joints of the flagellum, after the first, are wider than long, the first being fully as long as 2 and 3 united.

HAB. Hawaii: Hilo, in July.—Maui: Lehaima (2000 feet), in January.—Oahu: Waianae Mts., in April.

This European species is known to occur also in Africa, Asia, Australia, and North America.

Tribe V. *BASSINI.*

BASSUS Fallen.

1813. *Bassus* Fallen, Sp. Nov. Hym. disp. meth. exhib. Lundae.

(1) *Bassus laetatorius* Fabricius.

1804. *Bassus laetatorius* Fabricius, Syst. Piez., p. 63.—1829. Gravenhorst, Ichn. Eur., III. p. 353.—1810. Panzer, Faun. Ins. Germ., p. 19, f. 19.—1852. Ratzeburg, Ichn. d. Forstins., II. p. 109.—1856. Holmgren, Monogr. Tryph. Suec., p. 353.—1895. Davis, Trans. Am. Ent. Soc., XXII. p. 19.

♀, ♂. Length 5·5 to 6 mm. Head and thorax, the abdomen (except the apex of the first segment, the second and third segments and the base of the fourth, which are red), the base of hind femora and an annulus near the middle and hind tarsi, black; the anterior orbits, the clypeus, the mandibles, except teeth, the palpi, the anterior margins of the lateral lobes of the mesonotum, the tegulae, a line beneath tegulae, the scutellums and a broad band on hind tibiae, white; legs, except as noted, rufous.

HAB. Maui: Lahaina (along coast), in January.—Oahu: Waianae Mountains, in March.—Hawaii: Hilo (H. W. Henshaw), in July.

This species, which is parasitic on the larvae of Syrphid flies, is now widely spread over the entire world, being recorded from Europe, Africa, Asia, Australia, New Zealand, Chatham Islands, Japan, Hawaii, North and South America, and the West Indies.

Subfamily V. *OPHIONINAE.*

Tribe II. *OPHIONINI.*

OPHION Fabricius.

1798. *Ophion* Fabricius, Ent. Syst. Suppl., p. 210.

Black, the orbits yellowish	(*1*) *O. nigricans.*
Luteous, the eyes, claws and sheaths of ovipositor black	(*2*) *O. lineatus.*

(1) *Ophion nigricans* Cameron.

1883. *Ophion nigricans* Cameron, Trans. Ent. Soc. London, p. 193.

♀, ♂. Length 16 to 19 mm. Obscure black, covered all over with a close pale pubescence, the orbits of the eyes before and behind yellow; the face [and sometimes] more or less of mesonotum, metanotum at base, pleurae and sternum, brownish [rarely entirely black]. Mesonotum margined along the side to the end of the scutellum, which is rugose. Metanotum finely rugose; at the base is a striated furrow. Pleurae finely punctured. Coxae finely punctured; spurs thick, setose on under side [sutures and second joint of trochanters, the tibiae and tarsi vary from brown to ferruginous]. Antennae [in ♀] somewhat shorter than the abdomen [in ♂ somewhat longer], obscure brownish fuscous. Wings hyaline; nervures fuscous; stigma livid. (Cameron.)

HAB. Hawaii: Kilauea.

(2) *Ophion lineatus* Cameron.

1883. *Ophion lineatus* Cameron, Trans. Ent. Soc. London, p. 192, ♀, ♂.

♀. Length 13 mm. Luteous. Eyes, claws, and sheath of ovipositor black. Wings hyaline; stigma pallid ferruginous, darker round the edges; nervures fuscous;

covered with a short white pubescence. Mandibles deeply bidentate, the apex blackish; foveae above face not very deep, longer than broad; covered with a white pubescence. Antennae a little longer than the body. Mesonotum almost shining, very finely punctured; mesonotum distinctly bordered all round; from the tegulae the carina curves round to the scutellum, along the side of which it goes to the end, the two keels converging as they do so, but not joining; the apex of the mesonotum is also bordered, and there is a lateral keel at the side of the scutellum in front behind the fore wings. The metanotum is more pilose than the mesonotum; it is finely rugose all over; at the base is a waved indistinct furrow. Abdomen covered with long, depressed, white hairs, especially at the apex; the ventral surface is darker than the rest. The long spur of the posterior tibiae is longer than the 2nd tarsal joint. Female and male. (Cameron.)

HAB. Hawaii: Lanai. Unknown to the author and not represented in the collections made by Mr Perkins.

PLEURONEUROPHION Ashmead.

1900. *Pleuroneurophion* Ashmead, Proc. U. S. Nat. Mus., XXIII. p. 86.

(1) *Pleuroneurophion hawaiiensis*, sp. nov.

(Plate IX. fig. 1, ♀.)

♀. Length 9·5 mm. Head obscure yellowish-white, the occiput fuscous; teeth of mandibles black; palpi brownish-yellow; ocelli large, arranged in a triangle; eyes large, extending almost to the base of the mandibles and sinuate within opposite the insertion of the antennae; antennae black, the scape, the pedicel and the ring-joints at apex and beneath, ferruginous; the thorax, the coxae and more or less of the trochanters, except their sutures, which are whitish, and the hind femora, black, rest of legs brownish or fuscous. Wings hyaline, the stigma and veins brown, except a whitish spot between the parastigma and the stigma; the stigma is lanceolate, the first abscissa of the radius being much swollen beyond its origin but becoming slender at tip; marginal cell long, while the cubitus is distinctly angulated. The abdomen is nearly twice as long as the head and thorax united, compressed and shaped as in *Anomalon*, the ovipositor exserted but short, not so long as the first joint of the hind tarsi. The head is smooth, impunctate; the mesothorax above is nearly smooth but distinctly sculptured at the sides, while the metathorax is rugulose, with one transverse carina, the space enclosed by it being much smoother than the portion beyond.

Type. Cat. No. 5553, U. S. N. M.

HAB. Hawaii. Described from a single specimen received from Mr Albert Koebele.

ATHYREODON Ashmead.

1900. *Athyreodon* Ashmead, Proc. U. S. Nat. Mus., XXIII. p. 87.

(1) *Athyreodon hawaiiensis*, sp. nov.

(Plate IX. fig. 2, ♀.)

♂. Length about 7 mm., the tip of the abdomen being broken off, the exact measurement is not ascertainable from the single specimen. Brownish, slightly paler beneath; head anteriorly, the mandibles, except teeth, the palpi and the tegulae, yellowish-white; antennae much longer than the body, light brown, the first joint of the flagellum being much the longest joint. Ocelli very large, prominent, the lateral almost touching the eye margin. Eyes large, sinuate within. Anterior legs, including the coxae, honey-yellow, the middle and posterior legs darker or brownish. Wings hyaline, the stigma, except a longitudinal streak, and the veins brown-black. The head is smooth, impunctate, the thorax above delicately, microscopically punctate, the sides shagreened, while the metathorax is finely rugulose, with a transverse constriction just back of the postscutellum, but without a distinct transverse carina.

HAB. Hawaii: Olaa. One ♂ taken in December.

BANCHOGASTRA Ashmead.

1900. *Banchogastra* Ashmead, Proc. U. S. Nat. Mus., XXIII. p. 87.

(1) *Banchogastra nigra*, sp. nov.

(Plate IX. fig. 3, ♀.)

♀. Length 12 mm. Wholly black, the anterior wings with a decided bluish tinge, the hind wings much paler, almost hyaline. The antennae are longer than the body, filiform, and entirely black, except the ring-joint at apex, which is pale. The face is somewhat closely punctate, the head behind and the thorax above being coriaceous; the scutellum is smoother, sparsely punctate, with the lateral margins elevated; the metathorax is short, with one transverse carina, the entire basal space being shagreened, while the space beyond, which represents the posterior truncature, is very coarsely rugulose. The legs are of moderate length, somewhat shorter than in other genera of the Ophionini, the hind tarsi not being longer than their tibiae. The abdomen is fusiform, subcompressed at apex, smooth and impunctate, the ovipositor not at all projecting.

HAB. Hawaii: Kilauea. One ♀ taken September 1895.

PYCNOPHION Ashmead.

1900. *Pycnophion* Ashmead, Proc. U. S. Nat. Mus., XXIII. p. 87.

Black; anterior femora and all tibiae and tarsi, except sometimes the hind pair, rufous; orbits black. Length 8—9 mm.; ovipositor not half the length of the abdomen ....(*1*) *P. kauaiensis.*

Black; anterior and middle legs, except middle coxae, rufous; orbits anteriorly white. Length 12—13 mm.; ovipositor as long as the abdomen ...(*2*) *P. molokaiensis.*

(1) *Pycnophion kauaiensis*, sp. nov.

♀, ♂. Length 8 to 9 mm. Differs from *P. molokaiensis* in its much smaller size, and without the white orbital lines; the anterior femora and tibiae, as well as the extreme tip of the middle femora and their tibiae and all tarsi, except the hind tarsi, rufous, the hind tibiae either black or rufous, variable; the metathorax is smoother than in *P. molokaiensis*, and is without a distinct transverse carina.

The male scarcely differs from the female: the antennae are proportionately longer, while the compressed abdomen, seen from the side, is a little narrower, with prominent claspers, its length being about three times as long as wide.

HAB. Kauai (4000 feet), in July. 2 ♀ and 2 ♂ specimens.

(2) *Pycnophion molokaiensis*, sp. nov.

(Plate IX. fig. 4, ♀.)

♀. Length 12 to 13 mm. Wholly black, except as follows: a line on the anterior orbits below the insertion of the antennae, as well as sometimes above the antennae, and a line on the hind orbits from the middle of the eyes downwards, white; last joint of maxillary palpi more or less yellowish; anterior legs from base of femora more or less rufous, their tarsi blackish or fuscous, the joints sometimes pale at apex (rarely with the coxae and trochanters rufous or rufous beneath), the propectus rufous. Wings hyaline, faintly tinged, the stigma and veins brown-black. Metathorax short, with a single transverse carina, the entire basal portion smooth and shining, the posterior face finely rugulose. The abdomen is a little longer than the head and thorax united, petiolate, compressed, smooth and shining, the ovipositor prominent, with a slight upward curve and as long as the abdomen.

HAB. Maui: Haleakala (5000 feet), in September.—Molokai, in mountains (4500 to 5000 feet), in April and September.—Kauai: Waimea Mts. (4000 feet).

EREMOTYLUS Förster.

1868. *Eremotylus* Förster, Verh. d. naturh. Ver. Rheinl., xxv. p. 150.

(1) *Eremotylus orbitalis*, sp. nov.

♀, ♂. Length 13 to 16 mm. Black; front and hind orbits, a transverse stripe back of the ocelli, and the labrum, obscure whitish or ivory white; the face is rarely wholly pale, although the clypeus anteriorly or on its disk is ferruginous or pale; mandibles rufous, with the tips black; palpi yellowish; coxae and hind legs black, the anterior and middle legs, except coxae, vary from a rufous to a rufo-piceous, the femora sometimes almost black (rarely with the front coxae and more rarely with the middle coxae, rufous).

Wings hyaline, the stigma and veins brown-black. Abdomen three or more times longer than the head and thorax united, compressed, smooth and shining, seen from the side not very wide at apex, the petiole subclavate, about as long as the first four joints of the hind tarsi united or a little longer than the second abdominal segment; third abdominal segment a little shorter than the second, the following gradually shortening. The head, except the face, is smooth, the face being finely punctate. The antennae extend a little beyond the middle of the abdomen, the first three joints being rufo-piceous, pale at apex; the flagellum is filiform, black, and clothed with a fine, black pubescence. Ocelli large, the lateral almost touching the eye margin. Eyes very large, subemarginate within opposite the insertion of the antennae, and extend almost to the base of the mandibles. The thorax above is coriaceous, the metathorax being finely rugulose, but without a transverse carina.

HAB. Hawaii (Koebele); Kona (2000 feet), in July (Perkins).—Kauai: Waianae Mts. (2000 to 4000 feet), in January, February and July.—Maui: Haleakala (4000 feet), in June.

ENICOSPILUS Curtis.

1820. *Enicospilus* Curtis, Cat. Brit. Ins., p. 352.—1835. Id. Ill. Brit. Ent., VII. p. 126.

1. Disco-cubital cell with two blister-like spots ....7.
   Disco-cubital cell with one blister-like spot.
      Abdomen not entirely black ....2.
      Abdomen entirely black.
         Orbits white, interrupted by the large lateral ocelli; tarsi ferruginous; second recurrent nervure from 2 to 3 times as long as the width of the third discoidal cell at base; first abscissa of the transverse median nervure in hind wings more than half the length of the second abscissa ....(*1*) *E. mauicola*. ♀.

2. Thorax not entirely black, usually brownish, castaneous, dark rufous, or pale ferruginous, sometimes marked with black ....4.

Thorax entirely black.

Terminal abdominal segments never dusky or blackish ....3.

Terminal abdominal segments always dusky or blackish.

Abdominal segments 2 to 3 or 2 to 4 in ♀ and 3 to 4 or to 5 in ♂ rufous, the rest dusky or blackish; transverse median nervure in hind wings with the first abscissa about half the length of the second recurrent nervure more than twice the length of the width of the third discoidal cell at base ....(*2*) *E. kaalae.* ♀, ♂.

3. Abdominal segments 3 to 8 castaneous or dark rufous.

Tibiae and tarsi and more or less of the trochanters ferruginous; antennae nearly as long as the body, light brown ....(*3*) *E. waimeae.*

4. Thorax immaculate or only faintly dusky at sides or in the sutures.......................5.

Thorax distinctly marked with black.

Thorax dark rufous or castaneous, the metanotum, disk of mesonotum, more or less, and the mesosternum black; legs, except apical half of femora, which is black, pale ferruginous; second recurrent nervure about thrice as long as the width of the third discoidal cell at base......(*4*) *E. variegatus.*

Thorax paler ferruginous, the metanotum from the transverse carina, the middle lobe of the mesonotum and the mesosternum black; legs pale ferruginous, abdomen with the sides, from 3rd segment, with a fuscous band; second recurrent nervure about twice as long as the width of the third discoidal cell at base; antennae yellowish, much longer than the body ....(*5*) *E. nigrolineatus.*

5. Thorax and abdomen, or the head and abdomen pale ferruginous or yellowish brown ....6.

Thorax and abdomen castaneous or dark rufous.

Legs ferruginous; orbits and face, except sometimes a dusky median streak, pale yellowish or whitish; antennae in ♀ shorter than the body, in ♂ as long or a little longer than the body; second recurrent nervure more than twice longer than the width of the third discoidal cell at base; transverse median nervure in hind wings with the first abscissa scarcely half the length of the second abscissa.......................(*6*) *E. castaneus.*

6. Disco-cubital nervure forming a curve, not angulated; second recurrent nervure about four times as long as the width of the third discoidal cell at base; transverse median nervure not interstitial with the basal nervure; antennae in ♀ considerably longer than the body ....(*7*) *E. henshawi.*

Disco-cubital nervure angulated a little before the middle; second recurrent nervure only about twice the length of the width of the third discoidal cell at base; transverse median nervure interstitial with the basal nervure; antennae in ♀ not longer than the body ....(*8*) *E. molokaiensis.*

7. Ferruginous; abdomen much darker or brown; antennae as long as or longer than the body ....(*9*) *E. longicornis.*

(1) *Enicospilus mauicola*, sp. nov.

♀. Length 17 to 20 mm. Black; the anterior orbits (narrowly) and the posterior orbits (broadly) white; mandibles rufous with black teeth, sometimes black at base; tarsi dark brown, the tibiae sometimes more or less brownish.

The antennae are as long as or a little longer than the body. Ocelli very large, the lateral contiguous to the eye margin. The face below the insertion of the antennae is finely punctate, the clypeus black or rufo-piceous, finely transversely aciculate, the labrum somewhat prominent or exposed and always rufo-piceous. The metathorax is rugulose, with the first transverse carina present, enclosing a smooth area at base. Wings sub-hyaline, the stigma and veins brown-black, a testaceous spot between the stigma and parastigma, while the disco-cubital cell has one small blister-like spot. Abdomen about twice as long as the head and thorax united, strongly compressed from the second segment, smooth, shining, and impunctate, but clothed with a fine, fuscous coloured, sericeous pubescence.

Hab. Maui. Lanai (2000 feet), in December.—Molokai, in the mountains (4500 feet), in September.—Kauai; Waimea Mts.—Oahu: Kaala (1500 feet), in January.

(2) *Enicospilus kaalae*, sp. nov.

♀, ♂. Length from 17 to 22 mm. Head yellowish white, the occiput and a broad band extending from the front ocellus to the tip of the clypeus black; mandibles reddish with the tip or teeth black; palpi brownish-yellow; antennae brown-black, extending to beyond the middle of the abdomen, the scape beneath, and the pedicel and ring-joint at apex, rufous; the first joint of the flagellum is nearly as long as joints 2 and 3 united; the ocelli are large, the lateral touching the eye margin; the thorax, most of the legs, and the first segment of the abdomen are black, the rest of the abdomen except the three or four terminal segments, which are more or less blackish or dusky, is rufous; all tibiae and tarsi rufous; wings hyaline or faintly tinged, the lanceolate stigma and venation brown-black, the disco-cubital cell with one small blister-like spot.

The head and thorax are almost smooth, or feebly, closely, microscopically punctate, the scutellum with elevated lateral margins, the sides of the thorax opaque, very finely, closely punctate, while the metathorax is finely rugulose, with a transverse carina at about its basal third. The abdomen is about two and a half times as long as the head and thorax united, compressed, with the first segment subclavate, very little longer than the second.

The male agrees well with the female, except that the antennae are a little longer than the body, obscure rufous or brownish, the abdomen a little differently coloured, the first and second segments being black, while the third to fifth are rufous.

Hab. Oahu: Kaala Mts. (6500 feet), in March 1892.

(3) *Enicospilus waimeae*, sp. nov.

♀. Length 15 to 16 mm. Resembles *E. mauicola*, but smaller, the abdomen slenderer, seen from the side, not so wide dorso-ventrally; the face below the antennae is obscure rufous or brownish; the antennae and the abdomen, except segments 1 and 2, are brown; the anterior trochanters, the second joint of the middle and hind trochanters and all tibiae and tarsi are pale ferruginous. Otherwise it is quite similar to *E. mauicola*, except that the blister-like spot in the disco-cubital cell is larger and of a triangular or oblong-oval shape, while the enclosure at base of the metanotum is punctate.

Hab. Kauai: Mts. of Waimea (4000 feet), in June.—Hawaii: Olaa, in December.

(4) *Enicospilus variegatus*, sp. nov.

♀. Length 20 to 22 mm. Brown or castaneous; the disk of the mesonotum more or less, a stripe on the scutellum, the mesosternum, the metathorax, except at base above, the apical two-thirds or more of the femora and abdominal segments 1 and 2, black; the orbits and the face are dirty white, the antennae are brown, longer than the body; while the legs, except as noted, are pale ferruginous, the last joints of the tarsi being fuscous. The metathorax is without the basal transverse carina.

Hab. Hawaii: Hilo (H. W. Henshaw); Olaa, in December (Perkins).

(5) *Enicospilus nigrolineatus*, sp. nov.

♀, ♂. Length 15 to 18 mm. Brownish-yellow, the antennae and the legs somewhat paler; a median line on the mesonotum, a large spot on the mesosternum and the disk of the metathorax from the basal transverse carina, and a more or less distinct line on the sides of the abdomen, dark fuscous or black.

The antennae are much longer than the body, yellowish, in both sexes, the first joint of the flagellum being scarcely so long as the second and third joints united. The basal transverse carina of the metathorax is distinct in both sexes, and the space enclosed by it is much smoother than that beyond. The wings are hyaline, the stigma and the veins, except the second abscissa of the median vein and the second abscissa of the radius, which are brown, being yellowish.

Hab. Lanai (2000 feet), in January.—Kauai: Waimea Mts. (4000 feet), in June.—Hawaii: Hilo (H. W. Henshaw), in May; Kona (4000 feet), in August, December.—Maui: Haleakala (5000 feet), in May.—Molokai, in mountains (3000 feet), in June and September.

(6) *Enicospilus castaneus*, sp. nov.

♀, ♂. Length 16 to 20 mm. Castaneous or dark rufous; orbits, anteriorly and posteriorly, and the face below the antennae, yellowish or yellowish-white; legs ferruginous, the hind coxae sometimes brownish; wings hyaline or only faintly tinged, the stigma and veins reddish-brown, the disco-cubital blister-like spot small, triangular.

The antennae in the ♀ are scarcely as long as the body, involute at apex, reddish-brown, with the first joint of the flagellum as long as 2 and 3 united; in the ♂ they are much longer than the body, the first joint of the flagellum being only one-half longer than the second. The width of the third discoidal cell at apex is about twice as wide as at base, while the first transverse carina of the metathorax is distinct in the ♀, but in the ♂ entirely or nearly obliterated, although sometimes with a trace of the carina left.

HAB. Hawaii: Kilauea (H. W. Henshaw), in May, (Perkins), in August; Kona (6000 feet), in September; Olaa in May (H. W. Henshaw), in September (Perkins). Lanai (2500 feet), in February.—Molokai (2000 to 4500 feet), in March, June and September.—Oahu: Waiamea Mts. (2000 feet).

(7) *Enicospilus henshawi*, sp. nov.

♀. Length 9 to 10 mm. Head entirely, the antennae, the tegulae, the prosternum, the legs and the abdomen pale ferruginous, the thorax brown; wings hyaline, the stigma and veins brown, the disco-cubital nervure strongly curved, almost interstitial with the second transverse median nervure, causing the third cubital cell to be unusually narrowed at base, the second recurrent nervure being more than four times longer than the width of the third discoidal cell at base.

The antennae are longer than the body, the first joint of the flagellum being long, but still shorter than the second and third joints united. The metathorax shows not a trace of the transverse carina, while the abdomen is twice as long as the head and thorax united, the petiole and second segment being long, nearly equal, the former slightly the longer.

HAB. Hawaii: Hilo. Taken by Mr H. W. Henshaw in May.

(8) *Enicospilus molokaiensis*, sp. nov.

♀, ♂. Length 11 to 13 mm. Uniformly pale ferruginous, except that the orbits and face are more or less whitish, the legs much paler, with a yellowish tinge; the costal veins and sometimes the margins of the stigma and the first abscissa of the radius, which is much incrassated towards base, are brown, the other veins being paler.

The antennae, in the ♀, are a little shorter than the body, involute at apex, the last joint being fusiform, the thickest joint and as long as the two preceding joints united, the penultimate and antepenultimate joints being about equal and only a little longer than thick, the first joint of the flagellum is elongate and very nearly as long as the second and third joints united; in the ♂ they are longer than the body and slenderer toward apex, the terminal joints being proportionately longer, the last, however, being shorter than the two preceding united, which themselves are twice as long as thick, the first joint of the flagellum being distinctly shorter than the second and third united. The basal transverse carina of the metathorax is distinct in the ♀ but absent in the ♂. Wings hyaline, only faintly tinged, the disco-cubital blister-like spot pear-shaped, the disco-cubital nervure (unlike other species) distinctly angularly broken very near its middle and thus easily distinguishing the species from all others.

Hab. Hawaii: Kanai (2000—3000 feet), in January and February, (4000 feet), in July; Olaa, in September; Kona (4000—4500 feet).—Lanai (2000 feet), in February; Waimea (4000 feet), in May.—Molokai, in mountains (4000 feet), in January, July and September.

(9) *Enicospilus longicornis*, sp. nov.

♂. Length 15 to 17 mm. Ferruginous; orbits and face below the antennae whitish; eyes large, black or brown-black; wings hyaline, or only faintly tinged, the stigma and the costal veins brown, the parastigma, stigma at base and the outer nervure of the marginal cell, as well as the blister-like spots in the disco-cubital cell, yellowish.

The antennae are long and slender, longer than the body, tapering off at apex, the terminal joints about of an equal length, more than 2½ times longer than thick, the first joint of the flagellum being about as long as the second and third united. The metathorax has no trace of the basal transverse carina. The disco-cubital cell, unlike the 8 previously described species, has two blister-like spots, the larger of which is of an irregular triangular shape, the smaller being more or less ovate.

Hab. Hawaii: Kilauea.

Tribe IV. *ANOMALINI.*

ATROMETUS Förster.

1868. *Atrometus* Förster, Verh. d. naturh. Ver. Rheinl., xxv. p. 146.

This genus is represented in the Hawaiian fauna by seven species, separable with the aid of the following table.

1. Thorax mostly rufous, sometimes marked with black ....7.

Thorax and abdomen mostly black, the prosternum, mesosternum and mesopleura sometimes pale ....2.

2. Mesopleura, including the pro- and meso-sternum, yellow or pale yellowish, rarely dusky on the disk..6.

Mesopleura with a longitudinal yellow band across the disk, or the mesosternum is marked with black ....4.

Mesopleura wholly black ....3.

3. Hind coxae and femora black; anterior orbits, face below antennae, a spot on hind orbits superiorly (sometimes connected with the anterior orbital lines), the cheeks, prothorax, except sometimes superiorly, and the front and middle coxae and trochanters yellow (♀); in ♂ the hind orbits are without a spot, while the prothorax is yellowish only beneath; antennae, with ring-joint, 28-jointed ....(*1*) *A. flavifrons.*

Hind coxae and femora rufous; tarsi, or at least the hind tarsi, more or less fuscous, the front and middle pairs sometimes pale; the face below the antennae, cheeks but not hind orbits, prothorax more or less beneath and the front and middle coxae and trochanters, yellow, or pale yellowish. ♀. ....(*2*) *A. tarsatus.*

4. Metathorax not wholly black..5.

Metathorax wholly black.

Mandibles, except tips, the orbits, except an interruption at the summit of the eyes, the face below the antennae, prothorax beneath, a longitudinal band on the mesopleura and the anterior and middle coxae, lemon-yellow. ♂...(*3*) *A. citricinctus.*

Mandibles, except teeth, the clypeus, the face below the antennae, the upper anterior orbits and the hind orbits, connected above, the prothorax entirely, a longitudinal band on the mesopleura, and the anterior and middle coxae and trochanters, lemon-yellow. ♂. ♀ agrees with ♂ except that the orbits are broadly interrupted above............(*4*) *A. molokaiensis.*

5. Metathorax with a large yellow spot on each side towards apex but not connected with a yellow band across the base; mesonotum entirely black; mesopleura mostly yellow, with a spot beneath the front wings and along the mesosternal suture, black. ♂. ....(*5*) *A. haleakalae.*

Metathorax with a large yellow spot on each side towards apex but connected with a yellow band across the base; mesonotum with a hook-like yellow mark on each side anteriorly, the inner angle of same extending as a band towards the scutellum. ♀. ....(*6*) *A. hawaiiensis.*

6. Head, except a spot enclosing the ocelli and the occiput, a hook-like band on each side of the mesonotum anteriorly, prothorax, mesopleura, including the mesosternum, except a black spot beneath the insertion of the front wings, a large spot on sides of metathorax connected with a band across the base and the scutellum, lemon-yellow. ♂......................................(*6*) *A. hawaiiensis.*

Head black, the face below the antennae (entirely), mandibles, cheeks, front and middle legs, prothorax, mesopleura, including the sternum, except a spot beneath the insertion of front wings and a faint spot on the metapleura, yellow or yellowish-white. ♂..(*7*) *A. delicatus.*

7. Head, except the occiput and a large spot enclosing the ocelli which are black, lemon-yellow; prothorax, scutellum, mesopleura including the sternum, and the front and middle legs, pale yellowish. ♀. ....(7) *A. delicatus.*

(1) *Atrometus flavifrons*, sp. nov.

♀. Length 5 to 7 mm. Black, subopaque, the head coriaceous, the mesopleura finely, closely, evenly punctate, the metathorax rugose, the hind coxae coarsely coriaceous; a dot on temples just back of eyes, anterior orbits, face below the antennae, clypeus, mandibles, cheeks, an annulus at apex of scape, prothorax, except a spot on the prosternum, tegulae, front and middle coxae and trochanters, extreme apex of hind coxae, sutures of trochanters, and the extreme base of their femora and extreme base of their tibiae, yellow; rest of front and middle legs, except more or less of their tarsi, testaceous; apices of front tarsi, apices of joints 1 to 3 and joints 4 and 5 of middle tarsi, fuscous or black; hind coxae and femora, except as noted, black (rarely reddish-brown), their tibiae and tarsi, dark brown or fuscous, the tarsi sometimes black; scutellum more or less brownish; dorsal abdominal segments 2 to 7 at sides ventrally marked with reddish, rest of the abdomen black, the sheaths of the ovipositor being not quite as long as the basal joint of hind tarsi. Wings hyaline, the stigma and veins dark brown. The eyes are very large, converge below and extend to the base of the mandibles. The antennae are 27-jointed, or, with the pedicellus, 28-jointed, black, and as long as the body; the flagellum being slightly thickened towards apex, the basal joints elongate, cylindrical, the first the longest joint, although only slightly longer than the second, about 9 times as long as thick.

♂. Length 4·5 to 5 mm. Agrees very closely with the ♀ in colour, except that the temples are usually immaculate, the scutellum black, the front and middle tarsi paler, the hind femora reddish-brown, the hind tibiae fuscous towards base and apex, their tarsi fuscous, while the antennae, with the pedicellus, are only 24-jointed.

HAB. Hawaii: Kona (2000 feet), in August; Olaa, in December.—Lanai, in July.

(2) *Atrometus tarsatus*, sp. nov.

♀. Length 6 mm. Allied to *A. flavifrons* but differs as follows: the face from the antennae downwards, but not the superior orbits, the prothorax beneath, the scape and the ring-joint, are yellow; sternum black; the hind legs are rufous, their coxae above and the first joint of their trochanters above, have a dusky blotch, their tarsi being fuscous or subfuscous; the third and fourth dorsal abdominal segments ventrally at sides are rufous, the following segments being black. The antennae are 23 or 24-jointed.

The ♂, or what is supposed to be the ♂, has the orbits connected by a yellow band, the prothorax, except a spot on its pectus, and the scutellum are reddish, while the hind coxae, except at apex, are black, their tibiae at tips and their tarsi being fuscous.

Hab. Hawaii: Kona (3500 feet), in July.

(3) *Atrometus citricinctus*, sp. nov.

♂. Length 6 mm. Black; the orbits, except an interruption at summit of eyes, the face below the antennae, the mandibles, except the teeth, the prothorax beneath, the front and middle coxae and their trochanters, except above, a longitudinal band on the mesopleura, the tegulae, and the apex of the scutellum, lemon-yellow; rest of the front and middle legs reddish; the hind legs mostly black, their tibiae medially-reddish. Wings hyaline, the stigma and veins brown-black. Antennae, with the annular joint, 27-jointed, as long as the body.

Hab. Hawaii: Kilauea, in August and September.

(4) *Atrometus molokaiensis*, sp. nov.

♀. Length 8 mm. Black; the orbits entirely, the face below the antennae, mandibles, prothorax, tegulae, scutellum, a longitudinal band on the mesopleura and the front and middle coxae and trochanters, lemon-yellow; rest of the front and hind legs mostly castaneous or dark rufous, their coxae above blackish, pale at base and beneath, the tips of their tibiae and tarsi black or dark fuscous; venter more or less testaceous. Antennae 28-jointed, longer than the body.

Hab. Molokai, in the mountains (4500 feet), in August.—Maui: Haleakala.—Hawaii: above Hilo, in December.

(5) *Atrometus haleakalae*, sp. nov.

♂. Length 6 to 6·5 mm. Black; the orbits sometimes narrowly interrupted at the summit of the eyes, face below the antennae, prothorax, scutellum, except at base, the mesopleura, except a spot beneath the tegulae and a spot along the mesosternal suture, an oblong spot on the sides of the metathorax, and the hind coxae, except a large black spot above, lemon-yellow; palpi, anterior and middle coxae and trochanters, yellowish-white; rest of legs mostly reddish or testaceous, the tips of the hind tibiae and their tarsi black or fuscous. Wings hyaline, the stigma and veins dark brown. Antennae, with the annulus, 28-jointed, as long as the body.

Hab. Maui: Haleakala (5000 feet), in March and April.—Molokai, in mountains (4000 feet), in July.

(6) *Atrometus hawaiiensis*, sp. nov.

(Plate IX. fig. 5, ♀.)

♀. Length 10 to 10·5 mm. Black; the head, except the occiput and an oblong spot on the vertex extending forwards to the base of the antennae and enclosing the ocelli, the prothorax, a hook-shaped spot on each side of the mesonotum anteriorly and extending along its outer margins to the tegulae, the mesopleura, except a spot beneath the tegulae and on the sternum, the scutellum, an oblong spot on the sides of the metathorax connected with a band across its base (neither so distinctly defined nor as yellow as in the ♂), and the anterior and middle coxae and trochanters, lemon-yellow; the rest of the front and middle legs, except the tarsi, are reddish, the tarsi being more or less fuscous; the hind legs are rufous, the coxae and trochanters above marked with black, the extreme base and apex of their femora, the apex of tarsal joints 1 to 3 and the following joints black or fuscous; abdomen black, the venter and more or less of dorsal segments 2 to 6 ventrally, testaceous. Wings hyaline, the stigma and veins dark brown. Antennae black, 30-jointed, with the first three joints pale, although dusky above.

♂. Agrees very closely with the female, except that the antennae are 34-jointed, and that the mesopleura, except a small black spot just beneath the tegulae, are wholly yellow.

HAB. Hawaii: Kilauea, in August.

(7) *Atrometus delicatus*, sp. nov.

♂. Length 4·5 mm. Head, except a large spot on the vertex enclosing the ocelli, the prothorax, the mesopleura wholly, and a stripe on the sides of the metathorax, yellow; the palpi, the anterior and middle coxae and trochanters and the hind coxae at base, white, rest of the front and middle legs, except last joint of tarsi, honey-yellow, the hind legs red, their coxae except at base, their trochanters above, the extreme base of femora and tarsi, black or fuscous. Wings hyaline, the stigma and veins brown. Antennae 25-jointed, the first three or four joints pale, the following black or brown-black.

♀. Agrees well with the male, except that the thorax is brown, with the lateral mesonotal lobes, a spot beneath tegulae, the lower part of the mesopleura and the lower part of the metapleura blackish, while the hind coxae and the legs are paler than in male, without any black, although a little darker than the middle legs.

HAB. Kauai: Koholuamo, in April.

Tribe V. *CAMPOPLEGINI.*

IDECHTHIS Förster.

1868. *Idechthis* Förster, Verh. d. naturh. Ver. Rheinl., xxv. p. 154.

This genus is represented by a single species.

(1) *Idechthis oahuensis*, sp. nov.

♀. Length 7 to 7·5 mm. Head and thorax black, very closely punctate and clothed with a sparse, glittering white pubescence, that on the face denser and silvery; mandibles rufous; palpi, tegulae and front and middle coxae and trochanters, yellowish-white; rest of legs rufous or ferruginous, the hind tibiae and tarsi often more or less obfuscated or fuscous; abdomen mostly rufous or ferruginous from the apex of the second or third segment, but these segments are more or less dusky above; ovipositor a little longer than the hind tarsi. Wings hyaline, the stigma and veins brown, the areolet petiolate, the transverse median vein interstitial, the third discoidal cell about twice as wide at apex as at base. Antennae, with the annulus, 33 to 34-jointed.

HAB. Oahu: Waianae Mts., in March.—Hawaii: Hilo (H. W. Henshaw), in July.

LATHROSTIZUS Förster.

1868. *Lathrostizus* Förster, Verh. d. naturh. Ver. Rheinl., xxv. p. 154.

(1) *Lathrostizus insularis*, sp. nov.

♀. Length 6 mm. Head and thorax closely punctate, black and clothed with a sparse, whitish pubescence; first two joints of antennae, except on disk above, and the front and middle legs, except the coxae and trochanters, honey-yellow; mandibles, palpi, front and middle coxae and trochanters, the apex of hind coxae and sutures of trochanters, and all tibial spurs, yellowish-white; hind coxae, except at apex, black; rest of legs dark reddish; abdomen black, the apices of the third and following segments narrowly testaceous, at the sides more or less obscure, rufous; the ovipositor is about as long as the hind tarsi and has a slight upward curve.

The antennae are 30-jointed and extend to the base of the abdomen, the flagellum being brown-black, clothed with a very short sparse pubescence. The wings are hyaline, the tegulae and the subcostal vein yellowish-white, the costal vein and the outer edge of the stigma brown-black, the stigma within and the internal veins being light brown, the areolet being subpetiolate, nearly sessile. The metathorax is distinctly areolated, the areola, however, being confluent with the petiolar area, while the posterior face is transversely rugulose.

HAB. Molokai: Kaunakakai, sea level, in September.

LIMNERIUM Ashmead.

1858. *Limneria* Holmgren, Svensk. Vet.-Ak., Handl., II. p. 51.
1900. *Limnerium* Ashmead, Can. Ent., XXXII. p. 368.

1. Submedian cell in front wings not longer than the median, the transverse median nervure interstitial with the basal nervure ....2.

   Submedian cell in front wings longer than the median, the transverse median nervure not interstitial, uniting with the median vein beyond the origin of the basal.

   All coxae black, the front and middle trochanters, the second joint of hind trochanters, tibial spurs, anterior and middle tarsi, extreme base of hind tarsi, extreme base of hind tibiae and a broad annulus at the middle, as well as the tegulae, palpi and mandibles, yellowish-white ....(*1*) *L. polynesiale.*

2. All coxae black or at most with the front and middle coxae pale only at apex.

   Legs ferruginous, first joint of hind trochanters, the extreme base and apex of hind femora, an annulus at base of hind tibiae, separate from the apex of the femora by a narrow white annulus, its apical third or more, and their tarsi, black or fuscous; the hind tibiae medially, the scape beneath, the mandibles, the palpi, and the tegulae, yellowish-white ....(*2*) *L. hawaiiense.*

   Legs ferruginous; the middle and hind tibiae medially more or less, yellowish; the apices except extreme base, the first joint of middle and hind trochanters, apices of tarsal joints of front and middle legs and the hind tarsi, blackish or fuscous; scape wholly black ...(*3*) *L. blackburni* Cameron.

(1) *Limnerium polynesiale* Cameron.

1883. *Limneria polynesialis* Cameron, Trans. Ent. Soc., London, p. 191. ♀.

♀. Length, with terebra, 4 mm. Black; tegulae, trochanters at apex, and middle of four posterior tibiae, yellowish-white; base and apex of four posterior tibiae and femora reddish; anterior legs pale testaceous, the tibiae with a more yellowish tinge; posterior tarsi infuscated. Abdomen on the under side at the sides, and more or less above, reddish; segmental divisions yellowish-white at the sides, and more or less above on the three apical. Head and thorax semiopaque, finely punctured, covered (especially the face) with a white pubescence. Super-median areola distinct, semicircular; the others are somewhat compressed; posterior median triangular at base, and extending to the apex. Antennae as long as the thorax and abdomen, black, obscure fuscous beneath. Terebra curved, a little longer than the petiole, which is alutaceous. The abdomen is covered (especially the apex) with a pale pubescence. Wings hyaline; nervures and stigma pale testaceous; areolet complete, scarcely petiolated. (Cameron.)

The specimens taken by Mr Perkins measure only 4 mm. in length, but otherwise agree very well with Mr Cameron's description. The antennae in the ♂ are 28-jointed.

HAB. Maui: Haleakala, at an elevation of about 4000 feet (Cameron); Waialuna, Koolau range.—Oahu, in February 1893 (Perkins).

(2) *Limnerium hawaiiense* Cameron.

1886. *Limneria hawaiiensis* Cameron, Proc. & Mem. Manchester Lit. & Phil. Soc., x. p. 241, ♀.

[♀. Length 5 to 5.5 mm. Antennae in ♀ 26-jointed, in ♂ 29-jointed, the scape pale beneath.] Very similar in coloration and size (except that it is somewhat smaller) to *L. blackburni*, but differing from it in the head and thorax being *densely* covered with silvery-white pubescence, on *L. blackburni* (especially on the thorax) it being very sparse and the pleurae are almost glabrous; the posterior median area of the metanotum is narrower and longer; the femora are of a much paler red, the four posterior trochanters [except sometimes the first joint of the hind trochanters] are entirely yellow, there is no black at the base of the hind femora, the black on the tibiae is lighter, the four anterior tarsi are pale testaceous without any black, and the areolet is not only longer, but is also somewhat wider; the postpetiole is more strongly punctured, as are also the second and third segments, and the apical segments are more densely covered with white hair, the hair being also longer. The apex of the second segment and the greater part of the third segment externally are testaceous. (Cameron.)

HAB. Oahu.

(3) *Limnerium blackburni* Cameron.

1883. *Limneria blackburni* Cameron, Trans. Ent. Soc. London, p. 192.

♀. Length 6 mm. Black; the mandibles, palpi, trochanters, knees and tibiae (except at base and apex), and the spurs, yellowish-white; femora and base and apex of anterior tibiae reddish; base of four posterior femora, base and apex of posterior tibiae, blackish; coxae and base of trochanters black; anterior tarsi fuscous; the base of the tarsal joints pale. Abdominal segments at junction white; ventral surface at base yellowish. Head, thorax, and coxae almost opaque, faintly punctured, covered with a white pubescence, which is especially long on the face. Abdomen semiopaque, very finely punctured; terebra as long as the four last segments together; base of petiole smooth, almost shining. The three basal areolae of metanotum are less strongly punctured than the rest; the superior median areola small, distinct, semicircular, broader than long; posterior median triangular at base; from that it contracts slightly, and ends above the middle of the metanotum, where there is another field longer and somewhat oval in form, which occupies the rest of the middle space; the posterior intermedian area is semiobsolete, small; spiracular, large, wider at base than at apex; at the base it becomes rounded and enlarged. Wings hyaline; areolet shortly stalked; stigma fuscous. (Cameron.)

Hab. Hawaii: Mauna Kea, at an elevation of at least 13,000 feet, on the snow near the summit.

Family LXXVII. ALYSIIDAE.

Subfamily II. *ALYSIINAE.*

Tribe II. *ALLOEINI.*

Aphaereta Förster.

1862. *Aphaereta* Förster, Verh. d. naturh. Ver. Rheinl., xix. p. 264.

(1) *Aphaereta muscae* Ashmead.

1888. *Aphaereta muscae* Ashmead, Proc. U. S. Nat. Mus., x. p. 646. ♀, ♂.
1898. Dalla Torre, Cat. Hym., iv. p. 42.

♀, ♂. Length 2 to 2·5 mm. Polished black; first two joints of antennae, the mandibles, the prothorax, the legs and the first segment of the abdomen, honey-yellow or reddish-yellow.

The antennae in the ♀ vary from 21 to 23-jointed, in the ♂ from 24 to 26 joints, the first and third joints of the flagellum being subequal, shorter than the first. The mesonotum is without a fovea just before the scutellum, the scutellum being deeply foveated at base and divided by a delicate median carina into two parts, the bottom usually showing a few striae; the postscutellum is carinate; the metathorax posteriorly is strongly wrinkled, while the upper basal part of the metanotum is short, smooth, with two areas, the median or dividing carina being strongly developed and elevated posteriorly, the furrow on the mesopleura being crenate. The wings are hyaline, ciliate, with the costae and the narrow stigma brown, the internal veins much paler or yellowish-white; the first abscissa of the radius is about as long as the second transverse cubitus, rarely a little longer, while the latter is about half the length of the first transverse cubitus, or a little shorter.

Abdomen oblong-oval, the first dorsal segment being longitudinally striate, with two carinae toward base, becoming obsolete at about the middle of the segment; rest of the segments smooth and polished, the ovipositor about as long as the hind tarsi.

HAB. Hawaii: Kona (2000 feet), in September (4000 feet), in August.—Oahu: Waianae Mts. (3000 feet), in April.—Molokai Mts. (3000 feet), in May and June.—Kauai: Mts. Waimea (4000 feet), in June.—This species is widely distributed over the United States and in Canada.

ASPILOTA Förster.

1862. *Aspilota* Förster, Verh. d. naturh. Ver. Rheinl., XIX. p. 268.

(1) *Aspilota konae*, sp. nov.

♀. Length 2·1 mm. Polished black; antennae 28-jointed; the mandibles, except the teeth, first two joints of antennae, first segment of abdomen and the legs, including the coxae, honey-yellow; palpi white; flagellum black, bearded with rather long sparse hairs.

The mesonotum has a central fovea posteriorly just in front of the scutellum; the scutellum is convex, deeply foveated at base, the fovea divided into two parts by a delicate median carina, while the metanotum is biareolated, the posterior face of the metathorax being wrinkled. The wings are hyaline, ciliated; the costa and the linear stigma, as well as the radius, are brown, the internal veins being pale. The abdomen is compressed from the second segment and ends in an upward curved ovipositor, which is not longer than the basal joint of the hind tarsi.

HAB. Kona (2000 feet), in October. Described from a single specimen, taken by Mr Perkins.

Family LXXVIII. BRACONIDAE.

Subfamily IX. *CHELONINAE.*

CHELONUS Jurine.

1807. *Chelonus* Jurine, Nouv. méth. Hym., p. 289.

(1) *Chelonus blackburni* Cameron.

1881. *Chelonus carinatus* Cameron, Tr. Ent. Soc. London, p. 559 *nec* Provancher.

1886. *Chelonus blackburni* Cameron, Proc. & Mem. Manchester Litt. & Phil. Soc. X. p. 242.

1898. *Chelonus cameronii* Dalla Torre, Cat. Hym., IV. p. 200.

Univ. of Arizona Library

♀. Length 2·4 to 2·5 mm. Black, half-shining, covered with a close microscopic silky pubescence; the greater part of the scape of the antennae and the four following joints reddish testaceous; extreme apex of coxae, trochanters, apex and base of anterior femora, and the posterior knees, pale red; four anterior tibiae and tarsi pallid testaceous: hinder tibiae broadly annulated with white, the white ring being nearer the top than the bottom; tips of four anterior tarsi and the hinder pair fuscous; the greater part of the hinder metatarsus white; spurs white; basal third of abdomen white, except a blackish mark at extreme base; at the apex this white portion is rounded, and at its junction with the black colour passes into brown. Mandibles reddish. Antennae about the length of the body, 17-jointed, the seven apical joints thicker than the basal ones. Head finely punctured, the face covered with white hair. Mesonotum finely punctured. From the usual transverse ridge at the base of the scutellum there runs a central straight carina, and outside of this again are two curved outwardly, but it is only the second which reaches the edge of the thorax; these keels are united by fine cross-bars. Scutellum smooth, shining on basal half, apical half with longitudinal striations. Metathorax punctured, and with distinct coarse longitudinal striations, truncated at the apex, and with a minute tooth at each edge. Abdomen about the length of head and thorax, finely punctured, the punctures almost obsolete on the basal white portion. The second segment depressed in the centre, and produced at the sides into a leaf-like ridge, from the inner side of which runs an almost obsolete carina in the direction of the centre of the segment, but which is not reached. The union (apparent) of the second with the third segment is indicated by a fine transverse line. Wings hyaline, stigma, radial and cubital nervures fuscous; other nervures pale testaceous. (Cameron.)

HAB. Oahu. Various localities (Cameron).—Kauai: a single ♀ taken by Mr Perkins.

PHANEROTOMA Wesmael.

1838. *Phanerotoma* Wesmael, Nouv. Mém. Ac. Sc. Bruxelles, XI. p. 165.

(1) *Phanerotoma hawaiiensis*, sp. nov.

♂. Length 2·6 mm. Brownish-yellow; the eyes, ocelli, a spot in the depression on each side of the postscutellum, a band across base of the metanotum, interrupted medially, a narrow lateral stripe on first abdominal segment, subobsolete towards apex, and a broad lateral band on the second and third segments, black. Wings hyaline, the costae brown, the stigma and internal veins paler; the second cubital cell is triangular, the radius having only two abscissae, the first abscissa being almost perpendicular, forming with the second almost a right angle, and being interstitial, or very nearly, with the second transverse cubitus.

The species is easily recognized from all of the described forms known to me by the peculiarity of the radius, all the other species having three abscissae.

Type. No. 5554, U. S. N. M.

HAB. Hawaii.

Described from a single specimen received from Mr Albert Koebele.

Subfamily X. *AGATHIDINAE.*

Tribe II. *MICRODINI.*

MICRODUS Nees.

1818. *Microdus* Nees, Act. Ac. Leop. Car., IX. p. 304.

(1) *Microdus hawaiicola,* sp. nov.

♀. Length 3 to 4 mm.; ovipositor fully as long as the body. Polished black, with the metathorax rugoso-punctate, the first segment of the abdomen being longitudinally striate, the second with a few striae only, a little beyond its middle; the first two joints of the antennae, the clypeus, the cheeks, the mandibles, the legs, except as noted below, and ventral abdominal segments 1 to 4, honey-yellow, or brownish-yellow; the palpi, tegulae, trochanters, more or less, and a narrow annulus at base of tibiae, yellowish-white; the hind coxae, except at apex, are black; the middle femora and hind tibiae and tarsi are brown or fuscous, while the hind femora vary from dark fuscous to black. Wings subhyaline; the stigma and the veins, except toward the base of the wings, are brown, the areolet being small, triangular and longly petiolate, the second discoidal cell being open at apex.

The abdomen is black; the ventral segments 1 to 4 pale, the third and beyond, usually with dusky spots, while the extreme lateral margins of the second segment are yellowish-white.

Type. Cat. No. 5555, U. S. N. M.

HAB. Hawaii (A. Koebele).—Kauai: Makaweli (2000 feet), in June.

The specimens from Mr Koebele are in the U. S. National Museum. The species is supposed to be parasitic on a *Tinea* larva.

Subfamily XII. *MICROGASTERINAE.*

PROTAPANTELES Ashmead.

1898. *Protapanteles* Ashmead, Proc. Ent. Soc. Wash., IV. p. 166.

(1) *Protapanteles hawaiiensis*, sp. nov.

♀. Length 3 mm. Black; palpi, tegulae, except two or three obscure points, and the tibial spurs, white or yellowish white; mandibles and legs, except coxae and the hind femora tibiae and tarsi, ferruginous; coxae black, the hind femora, tibiae and tarsi embrowned; antennae brown-black, the scape distinctly black. The head in front and on vertex is finely punctate, the face being without a median ridge, while the occiput is smooth impunctate. The thorax above and beneath is closely punctate, subopaque, the scutellum polished, with a few sparse punctures, the metathorax rugoso-punctate, without a ridge or an areolet, the basal angle of the metapleura polished and with a deep fovea. Wings hyaline, the stigma, costae and first branch of the radius brown, the other veins pallid. Abdomen oblong-oval, scarcely longer than the thorax and ending in a prominent ovipositor almost the length of the abdomen; the first segment and the basal third of the second sculptured, rest of the abdomen smooth and shining, the lateral membraneous margins of the first dorsal segment, and ventral segments 1 and 2, testaceous.

Type. Cat. No. 5556, U. S. N. M.

HAB. Hawaii. Described from one ♀ specimen, received from Mr Albert Koebele.

Subfamily XVI. *RHOGADINAE.*

Tribe IV. *DORYCTINI.*

ISCHIOGONUS Wesmael.

1838. *Ischiogonus* Wesmael, Nouv. Mém. Ac. Sc. Brux, IX. p. 125.

(1) *Ischiogonus palliatus* Cameron.

1881. *Monolexis? palliatus* Cameron, Trans. Ent. Soc. London, p. 560.—1898. Dalla Torre, Cat. Hym., IV. p. 235.

♀. Length 3 to 3·4 mm. Head cubical, shaped as in *Spathius*. Antennae 32-jointed, the joints of almost equal thickness throughout, the first joint of flagellum one fourth longer than second. Wings with two cubital cellules. Anterior discoidal cellule petiolate, hinder discoidal cellule open, recurrent nervure interstitiate. Neuration of posterior wings as in *Spathius*. Fore and hinder tarsi much longer than their tibiae; middle tarsi scarcely longer than tibiae. Abdomen subsessile; first and second segments separated by a deep transverse furrow, widest in the middle, where it projects behind; second segment shorter than first; the rest shorter, subequal. Ovipositor a little shorter than the abdomen. Pallid testaceous, a longish spot on vertex, one behind the eyes; the greater part of the lateral lobes of mesonotum and of pleurae and abdomen fuscous; the metanotum, metapleurae, and basal third of the abdomen dark testaceous. Legs white, a line on hinder femora, base of hinder tibiae, a broad line in middle and base of tarsi fuscous. Wings hyaline, costa testaceous; stigma fuscous, paler at base. Antennae longer than the body, fuscous at apex, and the other joints have a fuscous ring at apex. Head and mesonotum smooth, shining, impunctate; the head with a few longish scattered hairs; metanotum with an indistinct central carina, which bifurcates towards the middle of metanotum in two branches, which turn to the side; hinder half of metanotum slightly rugose, and sparsely covered with white hairs. The first and second abdominal segments are coarsely constricted longitudinally; on the extreme edge of first is a distinct keel, and from the base there run two central keels, which get lost in the striations in the middle of the segment; the basal half of the space enclosed by these keels is smooth, shining, not striated. The rest of the abdomen is smooth, shining, impunctate. The male has the antennae longer (distinctly longer than the body), the metanotum and base of abdomen darker; the fuscous ring on hinder tibiae is shorter, and the tarsi have only the apical joints fuscous. (Cameron.)

HAB. Oahu: Honolulu.

Subfamily XVII. *SPATHIINAE.*

Tribe I. *PAMBOLINI.*

ECPHYLOPSIS Ashmead.

1900. *Ecphylopsis* Ashmead, Proc. U. S. Nat Mus., XXIII. p. 146.

(1) *Ecphylopsis nigra*, sp. nov.

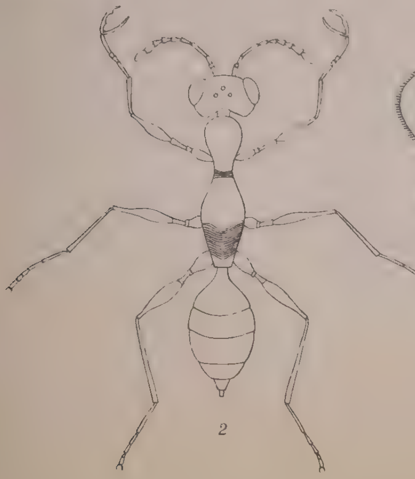
(Plate IX. fig. 6, ♀.)

♀. Length 1·5 to 1·6 mm. Apterous, or at most with small, scale-like wing pads; ovipositor prominent, hardly half the length of the abdomen. Black; the pedicel of antennae, at apex, the trochanters more or less, a small spot at base of all tibiae, sometimes wanting on hind pair, tibial spurs and joints 1 to 4 of all tarsi, except sometimes the last, testaceous. Head and abdomen, except first segment, shining, impunctate; thorax and first segment of abdomen shagreened or closely punctate. The head is quadrate, wider than the thorax; the antennae are 16-jointed, longer than the body, with flagellar joints 1 and 2 about equal, very little longer than the following, the following subequal. The thorax is considerably narrower than the head, somewhat narrowed anteriorly and about three and a half times as long as wide, the pronotum being longer than half the length of the mesonotum. The abdomen is oblong-oval, very nearly as long as the head and thorax united, and fully twice as wide as the thorax at its widest part, with six distinct segments, the second segment very slightly longer than the first, the following short, subequal, the third, fourth and fifth united scarcely longer than the second.

HAB. Kauai: Mt. Waimea (4000 feet), in June.—Hawaii: Kona (4000 feet), in June.

DESCRIPTION OF PLATE VIII. (VOL. I.)

Fig. 1. *Sierola molokaiensis* ♂.
Fig. 2. *Gonatopus Perkinsi* ♀.
Fig. 3. *Zacranium oahuense* ♀.
Fig. 4. *Platymischoides molokaiensis* ♀.
Fig. 5. *Hypodiranchis hawaiiensis* ♀.
Fig. 6. *Toxeuma tarsata* ♀.
Fig. 7. *Neolelaps hawaiiensis* ♀.
Fig. 8. *Mesolelaps cyaneiventris* ♀.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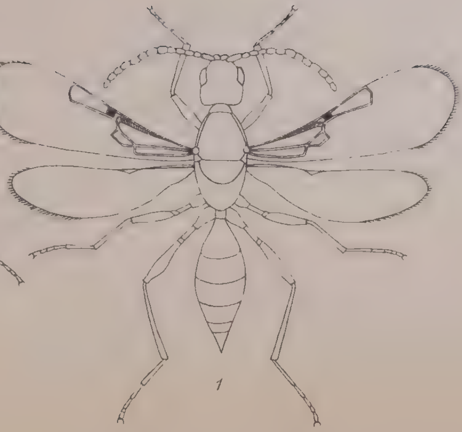
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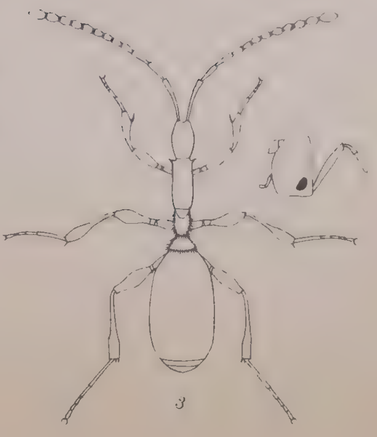
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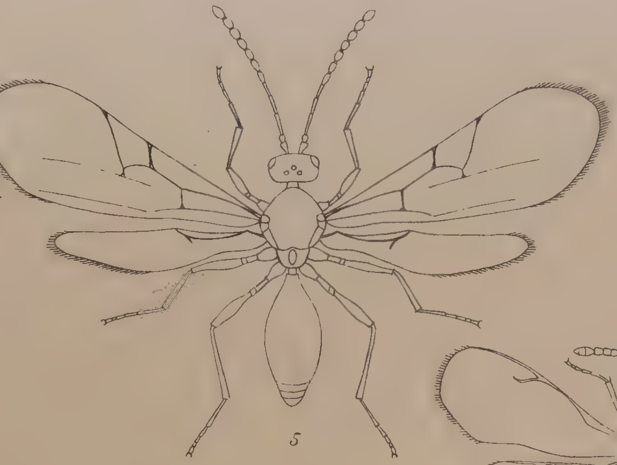
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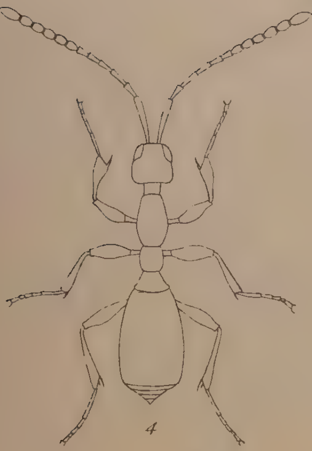
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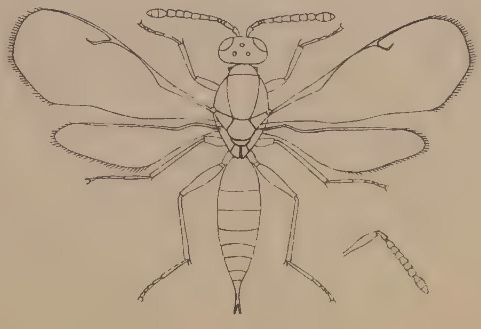
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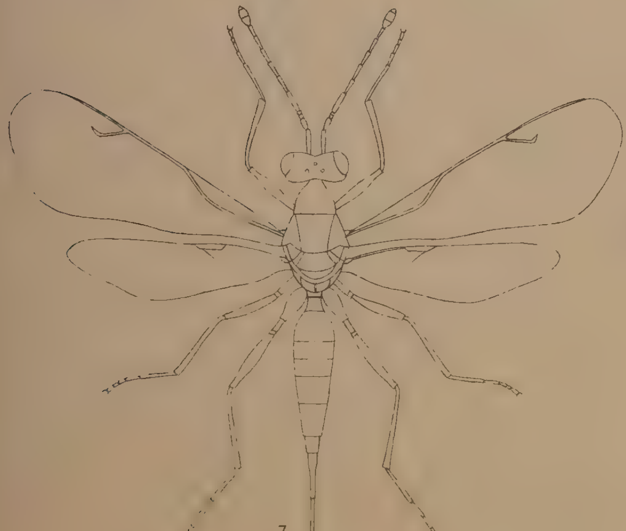
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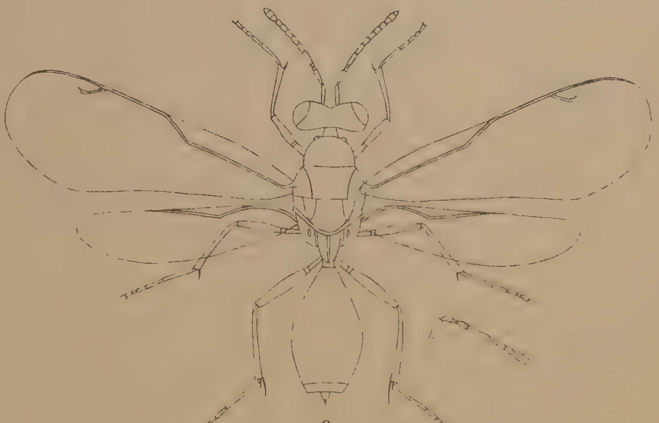
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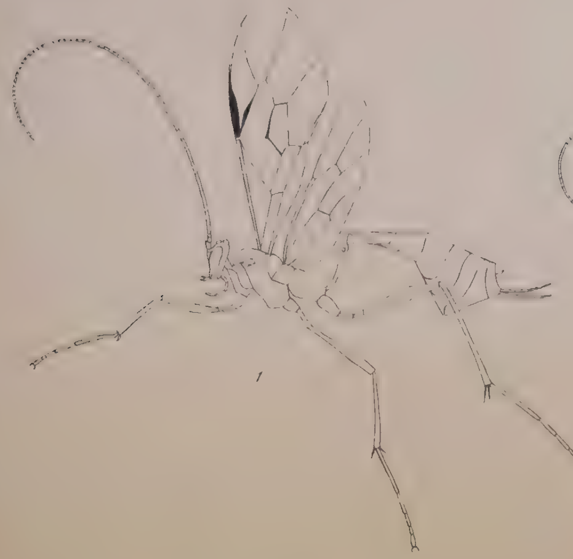
Ashmead. Hymenoptera Parasitica.

DESCRIPTION OF PLATE IX. (VOL. I.)

Fig. 1. *Pleuroneurophion hawaiiensis* ♀.
Fig. 2. *Athyreodon hawaiiensis* ♀.
Fig. 3. *Banchogastra nigra* ♀.
Fig. 4. *Pycnophion molokaiensis* ♀.
Fig. 5. *Atrometus hawaiiensis* ♀.
Fig. 6. *Ecphylopsis nigra* ♀.



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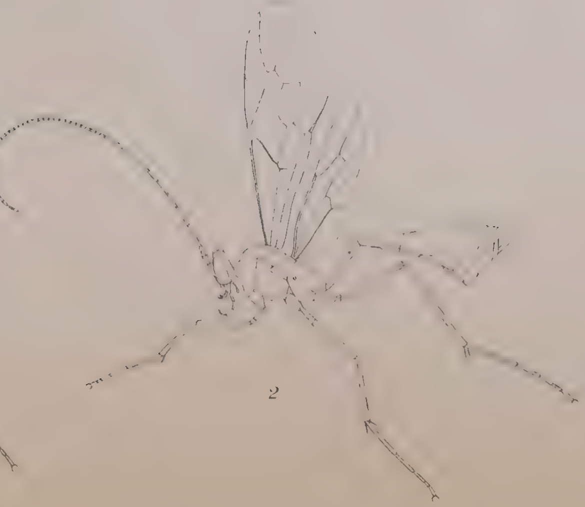

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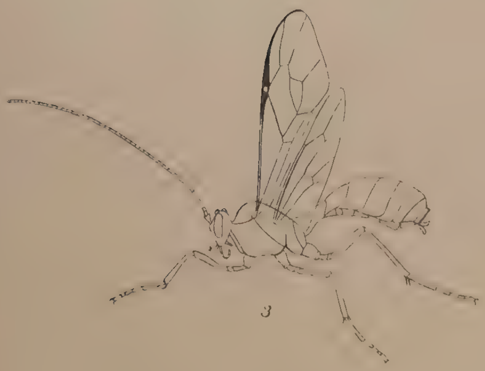

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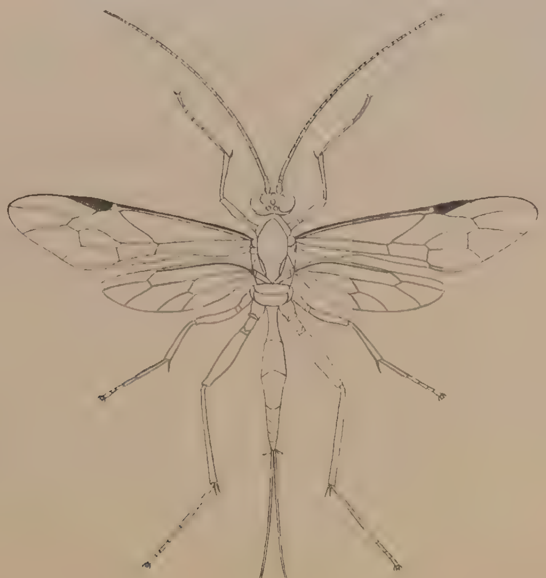

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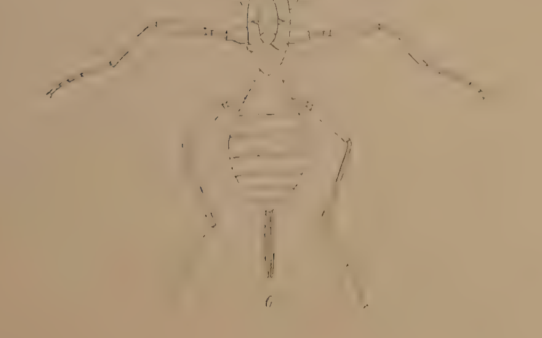

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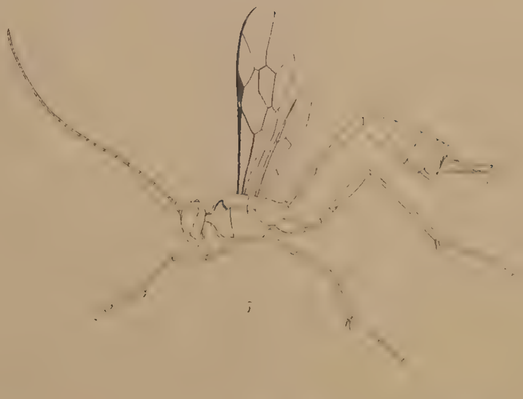

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Edwin Wilson, lith. Cambridge

Ashmead. Hymenoptera Parasitica.

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VOL. I. PART IV.

VERTEBRATA

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By R. C. L. PERKINS

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OR THE

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Being Results of the Explorations instituted by the Joint Committee
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VOLUME I. PART IV.

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By R. C. L. Perkins.

REPTILIA[2].

THE reptiles here enumerated are but seven in number, namely four geckos and three skinks. In addition to these several species of frogs and toads have been recently imported into the islands from Japan and America for economic reasons. These are naturally of no importance or interest in connection with the Hawaiian fauna and consequently are not included in the list. It is open to doubt whether some of the geckos and skinks may not also have been imported in ships since the occupation by white men, but it is certain that at least one of each of these groups was present before the discovery by Cook. The native name for all the species is Moo. All the known species have been fully dealt with by Dr Leonhard Stejneger in his paper on the "Land Reptiles of the Hawaiian Islands[3]," to which the reader is referred for descriptions of the species. In striking contrast with the birds, the lizards all appear to be widely if not universally distributed over the islands, and all have a wide distribution in the islands of the S. Pacific. All of the geckos commonly, and two of the skinks on some occasions, are to be seen within houses. The former are entirely nocturnal, coming out at dusk and running over the walls and windows of houses, and may also be seen hunting for food on the trunks and amongst the foliage of trees. In the day-time they hide under boards or stones, loose bark, in holes in tree trunks, behind pictures in houses, or in dark corners. Their food consists to a great extent of ants, especially of that detestable species *Pheidole megacephala*, but many other insects are devoured. Their partiality for entering houses is no doubt largely due to the fact that they there find abundant food, in the shape of insects, which are attracted by the light, as well as convenient hiding-places in the day-time. Even large insects are sometimes eaten, for on more than one occasion I observed a fox gecko catch and devour a mature female of a Locustid (*Xiphidium fuscum*). This insect, as large as a moderate-sized grasshopper, was swallowed whole, head first. The eggs of the geckos are usually placed in holes in tree-trunks or in cracks in woodwork, but are also sometimes attached to the leaves of plants in great numbers, often several in a bunch. As a rule the various species keep apart from one another when resting in the day-time. Thus under the bark of a single tree more than one hundred specimens of *Lepidodactylus lugubris* were observed, but no other species. Two groups of banana plants only a few yards apart were tenanted by different species, one of them producing the above-named species in numbers, while on the other were several examples of *L. crepuscularis*. After these latter were removed, in a day or two both of the banana patches were occupied by the former. *L. crepuscularis* is probably much less numerous than either of the other three species.

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[1] The Committee has not attempted to deal with the marine Fauna. The fishes found off the Hawaiian islands do not, therefore, come within the scope of this work. EDITOR.

[2] Arranged in accordance with the views of Mr G. A. Boulenger. EDITOR.

[3] Proceedings of the United States National Museum, Vol. XXI. pp. 783—813.

Of the skinks two (*Lygos cyanura* and *Ablepharus boutonii*) are diurnal and delight in the hottest sunshine. The former may be seen in thousands on old walls built of lava, and on black lava-flows, and the latter is also very numerous both on the lava rocks and on the trunks of large forest trees. The third species (*Lygosoma noctua*) I used to observe in Honolulu, catching the insects attracted by the electric light above the doorway of a house. Here quite a little colony had established itself, but after a time a large grey rat took up its position on the ledge above the door, feeding on the moths, which it caught between its front paws, and either it devoured the lizards also or at least they disappeared.

The eggs of the skinks are to be found in numbers in the cavities of porous blocks of lava, in holes in tree trunks and beneath the bark.

Possibly one or two of the existing Hawaiian species have been imported by man into the islands, but there is no doubt that most are to be considered as natural immigrants. The eggs and even some of the lizards themselves might easily be carried enormous distances with floating timber; quite as easily in fact as many of the indigenous insects, the ancestors of which can only have arrived by these means. It seems to me more than probable that the fact that they present little or no specific differences from outside forms is most probably due to the fact that belonging to common and widely spread species fresh individuals reach the islands by natural means, and the island-examples are not isolated for any great period of time.

Fam. GECCONIDAE.

Hemidactylus Gray.

(1) *Hemidactylus garnotii* D. & B.

Hemidactylus garnotti Duméril and Bibron, Erpét. Gén. III. p. 368; Stejneger, Proc. U. S. Nat. Mus. XXI. p. 792.

Hab. Kauai, Oahu, Molokai, Maui, Hawaii. Frequently seen in houses, and ranges from the coast to 2000 ft. in the mountains. In the open country under stones, logs, &c., in the woodland districts under bark of trees.

GEHYRA Gray.

(1) *Gehyra mutilata* Wieg.

Gehyra mutilata Wieg., Herp. Mex. I. p. 54.

Peropus mutilatus Stejneger, op. cit. p. 796.

HAB. Kauai, Oahu, Maui, Hawaii, and no doubt on the other islands. More rarely seen in houses than the preceding, but found with it under stones, bark of trees, &c. up to nearly 2000 ft. in the mountains of Oahu.

LEPIDODACTYLUS Fitz.

(1) *Lepidodactylus crepuscularis* Bavay.

Hemiphyllodactylus leucostictus Stejneger, op. cit. p. 800.

HAB. Kauai, Oahu, Hawaii, and no doubt on the other islands. Apparently the least common of the geckos; found in houses, under bark of trees, on bananas, &c.

(2) *Lepidodactylus lugubris* D. & B.

Lepidodactylus lugubris Dum. and Bibr., Erp. Gén. III. p. 304; *Lepidodactylus lugubris* Stejneger, op. cit. p. 788.

HAB. Kauai, Oahu, Maui, Hawaii, and no doubt on the other islands. Extremely common in many houses as well as outside. A valuable species, destroying large numbers of the small white-ant (*Calotermes*), which infests the houses in Honolulu and elsewhere.

OBS. In Honolulu and in many other localities this is by far the most numerous of the geckos, and the most partial to houses. Rather before sunset, at the time when the *Calotermes* issue in swarms from the rooms, these lizards may be seen moving actively around on the verandahs outside in pursuit of their prey, the larger occasionally driving off the smaller individuals, and constantly uttering their faint cry as they run along the woodwork, elevating the fore-parts of the body to the greatest extent possible. Unfortunately like the other geckos they are somewhat clumsy hunters and fail to catch a large proportion of the insects they pursue.

Fam. SCINCIDAE.

LYGOSOMA Gray.

(1) *Lygosoma noctua* Less.

Lygosoma noctua Lesson, Zool. Voy. Coq. II. i. p. 48.

Leiolopisma noctua Stejneger, op. cit. p. 805.

HAB. Kauai, Oahu, Hawaii, and probably on the other islands.

(2) *Lygosoma cyanurum* Less.

Lygosoma cyanurum Lesson, op. cit. p. 49.

Emoia cyanura Stejneger, op. cit. p. 807.

HAB. Oahu, Molokai, Hawaii, and probably on the other islands.

OBS. A specimen from Oahu is almost identical in colour with that of the original figure.

Ablepharus Fitz.

(1) *Ablepharus boutonii*, var. *poecilopleurus* Wieg.

Ablepharus boutonii, var. *poecilopleurus* Wiegm., Nov. Act. Acad. Caes. Leop. Carol. XVII. i. p. 202; Stejneger, op. cit. p. 811.

Hab. Kauai, Oahu, Molokai, Maui, Hawaii. From the coast to nearly 2000 ft. in the mountains; abundant.

AVES.

General introductory remarks.

1. The Birds of the Hawaiian islands, though few in number of species, compared with the Molluscs and Insects, are an important group and attracted the attention of the early visiting naturalists, who practically entirely neglected the larger groups. The work accomplished by the various workers at this avifauna up to 1892 has been fully dealt with by Prof. Newton in his paper published in "Nature" in that year. Since that time the elaborate works of Messrs Wilson and Evans and of the Hon. Walter Rothschild have been completed, and two other still more recent publications remain to be noticed. The first of these is a "Key to the Birds of the Hawaiian Group" by Mr William A. Bryan, curator in the Bishop Museum at Honolulu, consisting entirely of technical descriptions of species introduced and native, but without any notes of habits or of habitat other than the name of the island. The whole work is arranged on a strictly dichotomous plan, and is amply sufficient to enable anyone with a knowledge of the terminology of the descriptive ornithologist to at once distinguish the species of Hawaiian birds. The second is entitled "A complete List of the Birds of the Hawaiian Possessions, with notes on their habits," and is at the present time only partly[1] published ("Hawaiian Annual" 1902). It is written by Mr H. W. Henshaw, of Hilo, Hawaii, and much more space is given to an account of the habits of the birds, and to a consideration of questions of general interest, than to technical descriptions, which are reduced to the utmost brevity consistent with utility. These biological notes I have found of great interest, perhaps all the more so as they have mostly been made from constant observations restricted to a comparatively small area of the large island of Hawaii, and it is quite evident that in the case of some birds, habits rarely or perhaps never seen in that area become very noticeable in other localities. When one compares this list with that published in the same Annual in 1879 the enormous advance made in our knowledge of the Hawaiian avifauna during recent times can be readily estimated.

2. I have not considered it necessary to give any technical descriptions of the species, even those most recently discovered having been already described by various authors four or five times on an average. For the same reason all questions of synonomy and the synonyms themselves are entirely omitted, since either Wilson and

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[1] Since the above was written Mr Henshaw's list has been completed and published as a separate work.

Evans' or Rothschild's work is necessary for anyone who wishes to make an extensive study of the Hawaiian birds; and in both of these much space is given to these branches of the subject. For the ornithologist who is on a passing visit to the islands, or the resident who takes some interest in the birds of the islands, Henshaw's work when completed will be most convenient, and supplies a distinct want, while it is not less interesting to those who have made a more extensive study of the avifauna.

3. For present purposes the Hawaiian birds may be divided into two very strongly contrasted groups, (1) those that are entirely confined to the mountain-forests, (2) those which at least to a large extent frequent the open country, coast, or sea. To the former belong all the native Passeres, and these form by far the most interesting part of the avifauna. Excluding those which man has introduced within recent years, every Passerine species is peculiar to the islands and comparatively few are found on more than one of these. The second group is largely made up of sea-birds, ducks and waders, mostly of little or no interest in connection with a special study of this fauna, since very few of them are peculiar to the islands, and of these one or two (e.g. *Anous hawaiiensis*, which extends its range to Laysan, and *Puffinus newelli*) will very likely prove to have a wider distribution than is at present known. Many of them indeed are regular winter immigrants, but, owing to their entirely different nature, they throw no light on the question of the derivation of the other and more interesting part of the fauna. Scattered amongst them, however, are a few more interesting forms, especially the duck, *Anas wyvilliana*, the goose, *Bernicla sandvicensis*, the coot, *Fulica alai*, and the stilt, *Himantopus knudseni*, all peculiar to the islands. With these we may include two mountain forms, not Passerine, the extinct flightless rail (*Pennula*) and the buzzard (*Buteo solitarius*).

4. In these general remarks I shall deal only with the Passerine birds and shall briefly discuss the others in their proper order in the following list.

Excluding those lately introduced by man there are 49 species of this Order, and these represent five families, viz. Corvidae, Turdidae, Muscicapidae, Meliphagidae, and Drepanididae. The last-named, which is peculiar to the islands, includes the bulk of the species, these being 35 in number and distributed in no less than 17 genera. The Meliphagidae contain 5 species in two very distinct genera, both peculiar to the islands, one with a single, the other with four allied species. The Turdidae have five allied species, constituting a single very aberrant genus; the Muscicapidae three species, forming a peculiarly Hawaiian, but not isolated genus. The Corvidae are represented by a single species of *Corvus*.

Thus one (and that by far the most richly represented) family, all of the 22 genera excepting only *Corvus*, and all of the 48 species are peculiar to the islands.

These 48 species are in my opinion the descendants of at least six and not more than seven successfully immigrant species of Passerine birds. If the larger number be admitted this would mean two distinct (but closely allied) ancestral forms for the Drepanididae; but it seems to me more probable that these were developed in the islands from a single form. The structural characters exhibited by the many genera of Drepanididae are such that in no case is any single genus very isolated from that nearest to it, although the extreme forms are so widely separated. The division of the family into two lines of descent, if it be made, must certainly be based on differential characters which would appear to some ornithologists of minor importance, and these will be found fully stated in the table concluding my introductory remarks on the family. If we admit two ancestral forms it is probable that these reached the islands at nearly the same remote period, whereas in the Meliphagidae, of which there were certainly two immigrant ancestral species, it is most probable that the two immigrations took place at widely separated periods of time, and also that the original immigrants were themselves widely separated species.

As the species of Drepanididae are far more varied and numerous than those of the other families, so it is probable that the arrival of the stock, whence they are descended, much antedated that of the others. No doubt the Meliphagine Oo (*Acrulocercus*) is also an ancient colonist, but it has never been able to give rise to a second type of its family, either generic or specific, on any one island of the group; and herein it differs vastly from the Drepanididae, where numerous varied forms live in company on each and every island.

It might be supposed that the period of the occupation of the islands by *Acrulocercus* has been too short for the origin of new forms, but this is hardly likely considering, (1) the peculiarity and isolation of the genus as now constituted, (2) the considerable difference in form and the enormous difference in habits of the species inhabiting Kauai as compared with those on the other islands.

Far more likely to be the true reason is the fact that prior to the arrival of the ancestral form, which yielded the existing Oo, the islands were already fully stocked with diverse forms of nectar-eating Drepanididae, already become specially adapted to the existing flora and peculiarities of climate, while with these the new-comer had to compete, and but for its superior bodily strength might even have failed to hold its own. Is it not possible that the constant antagonism shown by the Oo to some of the Drepanididae of similar habits—attacks which now appear so unnecessary and unprovoked—may be the still surviving expression of that old hostility, which in earlier times was necessary to the bird's very existence? For similar reasons it is probable that the Oo of Kauai so far changed its habits as to become insectivorous to an enormous degree as compared with its relatives on the other islands, and its form is likewise changed and adapted to its habits. So too in the Drepanididae themselves the necessity for acquiring diverse food has led to the strange developments of structure exhibited by many of the present-day representatives. We can now see all stages in the change from a nectar-eating habit to a frugivorous or insectivorous one. Thus *Chlorodrepanis* feeds very largely on nectar and on insects, perhaps generally speaking one might say that about half its food consists of either; *Drepanorhamphus* is almost entirely a nectar-eater, *Heterorhynchus wilsoni* entirely an insect-eater, but the other three *Heterorhynchi* are partially nectar-eaters. So too some species of *Loxops* and *Oreomyza* are on rare occasions nectar-eaters, the rest purely insectivorous at all times.

Chaetoptila, the other Meliphagine genus, now extinct, was probably a much later arrival than the Oo, and would have had to contend not only with these but also with Drepanididae of similar habits. It appears to have been restricted to a limited area on the island of Hawaii only, and would have been particularly liable to succumb to slight changes brought about by civilization. It is not impossible, however, that, existing in so limited an area, and probably weak in numbers, its extinction was due to natural causes.

Phaeornis of the Turdidae is also an ancient colonist, and, comparing the known species with those of the Meliphagine *Acrulocercus*, we find the development to have been in many respects similar. Thus the former has four and the latter three very closely allied species, and each has in addition a species aberrant in form and highly aberrant in habits on Kauai, but with this distinction that, whereas *Acrulocercus braccatus* is widely spread and numerous, *Phaeornis palmeri* is of very restricted range and exists in very small numbers on that island.

The arrival of *Chasiempis* one would judge to be subsequent to *Phaeornis*, and last of all and comparatively recent must have been the arrival of *Corvus*.

The present Passerine avifauna may have been derived from the following types, two American, ? *Corvus* and *Drepanididae*; three or four from the Australian side, *Chasiempis*, *Chaetoptila*, *Acrulocercus*, and ? *Phaeornis*. Until however the affinities of some of these are more definitely determined it would be unsafe to consider the above division as by any means settled.

There is one other point in connection with the evolution of the Passerine fauna which may be noticed here. When the first immigrant species of these birds stocked the island or islands on which it settled, such checks to increase in numbers as existed were probably chiefly due to the extent of food supply, competition being necessarily restricted to the individuals of a single species with practically uniform habits; and it may be supposed that through this contest for food the first new species were subsequently evolved. Later on, as new species and new genera were produced with widely different habits, and new immigrant forms also arrived, so that most sources of food supply were in requisition, both the competition would become more severe, and the relation of species to species more complex. Nevertheless this complexity is after all infinitely less than that observable in other countries, where a much greater variety of birds exist having directly or indirectly much influence on one another, not to mention the frequent presence of birds raptorial and predaceous, of mammals and reptiles. Such can have had little or no effect on the avifauna of these islands, since either they do not exist or are of small importance in this connection. The short-eared owl is abundant, but it does not enter the depths of the forests, where is the true home of the Passeres. The buzzard (*Buteo solitarius*) is entirely restricted to one only of the islands, and though it will eat birds and eggs its food is largely derived from other sources. Moreover we can hardly suppose that either of these isolated birds has existed sufficiently long in the islands to have any important effect on the others. Consequently the Hawaiian Passeres furnish excellent material for the study of evolution of species, on account of the comparatively simple problem presented in their case.

CORVIDAE.

Corvus Linn.

Native name *Alala.*

The Alala is entirely confined to the large island of Hawaii, and even there is restricted to a limited area, namely, to the adjoining districts of Kau and Kona. In both of these districts I found it abundant locally during the first years of my collecting, but less abundant in some localities at a later period, partly owing to the fact that it suffers some persecution on account of its depredations, and partly on account of the great changes induced in some of its haunts by the presence of cattle. In the wet belt of the Kona district it was extremely numerous, especially inhabiting the open park-like country between the lava-flows, where dense masses of clinging Ieie (*Freycinetia*) invested the scattered trees. In these it nested freely, and numerous nests containing young were found in the summer months. At this time it was extremely tame and would often follow the intruder for a considerable distance, repeatedly uttering its harsh cries, thereby often attracting others from a distance, perhaps to the number of a dozen, the whole assemblage raising a deafening clamour. Here also it found abundant food in the large red fruit of the Ieie, which in this district attained unusual size. A few shot for dissection were absolutely filled with this food to the exclusion of all other, but numbers were noticed at odd times on the ground feeding on the decaying flesh of dead cattle. After the ripe fruit of the Ieie had disappeared a partial migration to a higher altitude in the mountains took place, and here the crows were eating the ripe berries of the Poha (*Physalis*), again varying this diet with the flesh of dead horses or cattle. Some years later wishing to get some skins in good condition I revisited this locality and found an evident decrease in the number of these birds, and those which I saw were decidedly less tame, but the required specimens were very easily obtained, since they readily respond and approach when their cries are imitated.

Although the Alala has now a wide range of food, yet this habit is probably lately acquired, and simply a reversion to the custom of its ancestors, rendered possible by the change of conditions that has taken place in the islands of late years. Thus carrion could have formed no part of its food, or at most an insignificant one, before the white man brought his cattle, nor before his arrival could it have obtained some other kinds of food to which it is now partial. It is however possible that at a time when the forest extended much lower than it now does, when the trees on the coast of the Kona district were, as we know, frequented by several forest birds which now are never seen there, the crow also visited these parts and obtained such animal food as it required amongst the shore refuse, as crows are wont to do in other countries. The deficiency of our knowledge of the conditions of the avifauna at a time when the country was still largely unchanged is much to be regretted, since the older explorers could so easily have supplied this, either from their own observations or on information derived from the native bird-catchers. It is at least probable that the Ieie yielded the chief food supply of the Alala under natural conditions, since I saw the old birds feeding their young with this food. Although the crow is said nowadays to eat the eggs and young of imported species of birds, it is hardly likely that it habitually molested native species. Thus many small native birds were abundant in the same trees as the Alala, but they seemed not to be in the least disturbed by the presence of the latter, and the Ou (*Psittacirostra*) might be seen feeding on the same food and in the same clump of Ieie.

The Alala is by no means deficient in powers of flight, and in early spring I frequently noticed them rising to an immense height in the air, often several together, where they could be seen playing or fighting on the wing. This habit makes it still more extraordinary that their distribution should be confined to so small an area, for one would have expected on this account that, even if not accidentally transported by sudden storms to other of the islands, they would at least have been universally distributed over the large one. It might be suspected that the climatic conditions of those districts, from which the crow is absent, must be adverse, since the food supply in most places is certainly not so. Yet, as we have seen, this bird readily migrates from the wet belt to the upper dry forest in Kona, which have distinctly different climates, and moreover, in the wet belt itself the weather differs very greatly in summer and winter. It is questionable therefore whether, if it extended its range to some parts of windward Hawaii, from which it is absent, it would encounter a greater climatic change than it now experiences in its own district. The young will live at least for a considerable time, and so far as I know for their natural life-time, in captivity, under conditions far from normal. The cause of the restricted range of the Alala is an unsolved enigma and to me inexplicable.

(1) *Corvus hawaiiensis* Peale.

HAB. Hawaii; abundant in Kona and Kau.

TURDIDAE.

PHAEORNIS Sclater.

Native name *Amaui* (syn. *omao*, *olomao*, *kamao*, &c.).

There are five known species of this genus, two of which inhabit Kauai, one the neighbouring islands Molokai and Lanai, one Hawaii, while the fifth was formerly found on Oahu, but is now extinct. The native names cited as synonymous are those now in general use over the islands, but they appear to me to be clearly corruptions of the true name, if not altogether wrongly applied. It is at least singular that the word "omao," meaning "green," should have been applied to a bird which is not at all green, and this in a country where the avifauna consists largely of green species. The word "amaui" I obtained from a very old source, as used by the old Kauai natives for the *Phaeornis* of that island, and to the Hawaii species the same name is applied in manuscript notes made by Bloxam in 1825, who there calls it "Amauee," spelling the word as it sounds to English ears. That a bird so conspicuous for its fine song should have been dedicated to the celebrated Polynesian demigod is quite natural, and it is hardly likely that the "manu amaui" or Maui's bird would have been known under a variety of names in olden days.

Excepting the small *P. palmeri* of Kauai, the slightly modified species of this genus are practically identical in their habits. All are largely frugivorous, feeding voraciously on the berries of the various forest trees. Throughout the islands the berry of the Opiko (*Straussia*) is perhaps in general their favourite food, but those of the Pua (*Olea*), Olapa (*Cheirodendron*), and many others are much sought after. From the stomach of a specimen of *P. lanaiensis* I took an entire unripe fruit, so large that it alone entirely filled the cavity, and even with its large gape the bird must have had some difficulty in swallowing it. *P. myiadestina* at certain seasons and in some localities on Kauai feeds almost entirely on the berries of the poisonous Akia (*Wikstroemia*). Besides berries the Amaui feeds on various insects, both winged and those in the larval state, as well as upon spiders and myriapods. When hunting the more active of these, it is lively and quick in its movements, making sudden rushes forward, often assisted by its wings. The species of Hawaii and Kauai are to be found in the largest forest trees as well as in the underbrush, but that of Lanai and Molokai, where the forest growth is generally much less tall, is equally abundant amongst small trees and bushes. All these birds are partial to caterpillars, especially those of Geometrid moths, commonly called "loopers" or span-worms, the peelua kuapuu of the natives (i.e. hump-backed caterpillars). They also continue to feed the young on these for some time after they have left the nest. In the earlier summer months of 1895 the Amaui of Hawaii was absent from the Koa woods above Kilauea on the Kau side, but in August there was a large incursion of this bird into these woods in company with the Ou (*Psittacirostra*). At this time the trees were defoliated by myriads of Geometer caterpillars, and on these the two were constantly feeding, both again disappearing after some weeks. Probably they came from the forests on the Olaa side, where they were numerous at all seasons. I noticed a similar accession to the ordinary residents under similar circumstances on the Kona side of the same island, but in this case it was less noticeable, owing to the locality being well stocked on all occasions. Henshaw remarks that of numbers dissected by him not 5 per cent. contained insect food, which is no doubt correct at certain times and places, but this statement would be far from true in cases such as I have just mentioned. Rather often these birds descend to the ground in the more open woods of the upper forest in Kona, where the ground is covered with dry phyllodes of the Koa, or amongst large fallen branches of these trees. In the same district, where they are extremely numerous, they sometimes catch insects on the wing with much expertness for such heavy birds, much after the manner of the fly-catchers.

As to the distribution of the various species, each in the island it inhabits, I have found all to be almost ubiquitous throughout the forest, wherever birds are found, from the lower limits to the upper, not only in the densest parts of dense forests, but also in the more open woods. In the lower forest of the Kona district, though perhaps more numerous on the rough lava-flows with their denser vegetation, the Amaui was common among the scattered trees of the park-like country between the flows. Here the trees covered with dense masses of climbing Ieie (*Freycinetia*) still afforded fine shelter, but seemed likely to do so for no long time, seeing that this covering was being rapidly stripped off by the cattle, of which it is a favourite food. In Molokai *P. lanaiensis* still lingers in remnants of forest from which all other native birds have disappeared, but of course it is much more plentiful in denser woods.

All these species when alarmed assume a similar attitude, drooping their wings and giving to these a shivering motion. Henshaw says that he has seen the bird go through this performance of its own accord when he himself was unnoticed, but it is doubtful whether in such cases the observer is really unnoticed. If one comes suddenly on one of these birds in the denser forests it will generally at once assume the characteristic posture and movements, but after a short time will begin to feed unconcerned within a few yards of the observer. In such cases the slightest movement on the part of the latter is sufficient to bring on a renewed attack of shivering. When one is standing in the dense forest, one can often hear the alarm note of several of these birds coming from various directions, when not a single individual can be discovered by the most careful scrutiny, showing that they are very quick to detect the presence of an intruder. For these reasons I think it is certain that these postures are essentially the result of alarm, but whether produced also by other emotions it would be very hard to say. I have certainly often been able to observe *Phaeornis* in the brush surrounding my tent, when this was closed except for a narrow chink, without any shivering attack being produced, while at other times the mere presence of so strange an object as a tent is apparently of itself sufficient to bring on one of these.

In my notes published in the "Ibis" in 1893 I called attention to the several points of similarity between the habits of *Phaeornis* and the fly-catchers of the genus *Chasiempis*, and in his recent paper Henshaw makes practically the same observations.

The song of the Hawaiian thrush surpasses in beauty that of all other native birds, of which one or two at the most have any claim to be considered as more than second-rate songsters. Lavish of its song, numerous and almost ubiquitous throughout the forests of the islands on which it is found, its voice more than atones for the sombre inconspicuous colours of its plumage. It is certainly much inferior to that of the common European song-thrush, being less melodious, far more jerky and less sustained. The wild outburst of song, which the Amaui pours forth on the wing as it descends from the top of a lofty tree to lower cover, can hardly fail to strike the attention of anyone who wanders through the forest. Often individuals sing in turn, as it were in rivalry of one another, the one beginning its song immediately after the other finishes. Sometimes several take their part in these concerts, and the performers may be stationed in trees only a short distance apart, or the one most distant from the observer may be only faintly audible. Whether in the breeding season or at other times, they are fond of special stations, and will sing at intervals during the whole day, and day after day from the same tree, and even from the selfsame bough. The alarm note is highly peculiar and characteristic, sounding like "quah," and this sound when uttered by one is readily taken up by others in the neighbourhood and at a distance. The Amaui is of all birds the first to make itself heard in the morning. Both in the uplands of Kona and the wet forests of Molokai I have heard it in full song while the stars were still shining and some time before the first grey of dawn appeared.

Besides the alarm note it has a very distinct simple whistle for a call note to which it will readily respond and by imitating which it may even be called close to the observer. It may be observed that these birds are distinctly of practical use in the forest, not only because they kill considerable numbers of insects, which are decidedly injurious, but still more because they surpass all the other birds in scattering the seeds of forest trees. Passing undigested through the bird, as most of these and perhaps all do, they are deposited in a condition suitable for germination, and it is perhaps due to this that the trees, to the berries of which they are most partial, are now so widely spread.

I have several times found the nest of *Phaeornis* but have never been so fortunate as to take the eggs. A nest of *P. obscura* was found in a Mamani tree in the uplands of Kona, but was not completely built. Unfortunately Mr Scott B. Wilson, who arrived in Kona to make a special search for the eggs of native birds on the eve of my departure, was unable to find the marks I had made in the forest, which would have led him to this nest. Quite recently I found two nests of *P. lanaiensis* on the island of Molokai both fresh and apparently nearly complete. One of these was placed in an Ohia tree at the height of about 25 feet from the ground in the midst of a thick forest, the other in the top of a Koolea tree (*Myrsine*) at about the same height, but far below the dense forest, in a locality where no other native birds except *Phaeornis* existed. In each of these cases a pair of old birds were continually in the vicinity of the nests, which were of simple structure, much like those of the Drepanididae, but of much larger size, built of dried leaves, twigs, and rootlets.

The smaller of the two Kauai species, *P. palmeri*, differs so much in its habits from the other members of the genus that it is necessary to consider these apart. Not only is it by far the rarest and most local of the Hawaiian thrushes, but it is also much more strongly separated by structural differences from the others than are they from one another. Its larger relative on the same island is especially numerous in the same locality as the species now under consideration, and after spending three weeks in specially studying this bird, I came to the conclusion that in this locality the larger was at least one hundred times more numerous than the smaller species. Owing however to their totally different habits there is little or no competition between the two forms, as at present constituted. If it should prove that this bird is really restricted to the area over which alone it has so far been collected, it is perhaps the most localized of any forest bird, surpassing even *Viridonia* and *Chloridops* of the Drepanididae in this respect.

P. palmeri chiefly frequents the underbrush and smaller-sized forest trees, rarely perching at any great height from the ground. It may be seen flying with a straight swift flight beneath the lower branches of these trees, sometimes alighting on a dead twig at a height of not more than three feet from the ground. More rarely it actually settles on the ground, and in one shot in this situation I found a small terrestrial species of land shell. When it alights on a really large tree it is usually on the lower branches, excepting only when about to sing, on which occasions it will perch on the topmost branches of one of the tallest trees in the vicinity.

All the specimens obtained by me proved on dissection to contain the large hard weevils of the genus *Rhyncogonus*, and these unquestionably form a large part of their food. Spiders and caterpillars are also eaten, and the insectivorous habits of the species are strongly contrasted with the berry-eating propensity of the other members of the genus. On one occasion I saw an old bird carrying a very large green looper caterpillar held crosswise in its bill, which was evidently intended either for its mate or young. It perched only a few feet directly above my head, exhibiting extreme agitation, but presently flew off and I was unable to trace it to its destination, owing to the thick fog and gathering darkness.

The young probably do not lose their spotted plumage for two seasons. One very foggy morning I saw a pair of birds in such plumage, on a low branch, not standing in the usual erect position, but squatting side by side and actually touching one another. Their feathers being much puffed out, they looked fully as large as the larger *Phaeornis*, when seen through the foggy air, and after a glance I passed on supposing them to be the common species. Returning considerably later I found this pair in exactly the same position and this time took a long look at them and again passed on, but feeling dissatisfied turned back and frightened them from their perch. Then I saw at once that they belonged to the smaller species, and killed the two at one shot in the neighbouring tree to which they had flown. On dissection they proved to be male and female, with the testes and ovaries very much enlarged, in fact in the condition of birds either breeding or about to breed. It will therefore probably be found that in this respect too *Phaeornis* (at least *P. palmeri*) resembles *Chasiempis*, the latter not very rarely breeding whilst still clothed in the ochraceous plumage of the young. It may be worth remarking, as showing the rarity of this bird, that although on the occasion mentioned I saw eight different individuals of *P. palmeri*, only on one or two other occasions did I see half this number on any one day, although I was fortunate enough to learn its alarm note and song at the very beginning of my search, and this in a thickly-forested district is of course an enormous advantage.

The song of the small *Phaeornis* is entirely different from that of the other species and is a simple trill with much resemblance to that of the Akialoa nukupuu (*Heterorhynchus*). When singing it frequently perches amongst the highest branches of tall trees and is seen with difficulty. The habit of singing on the wing is still retained, though the song itself is so much changed. The alarm note too is a squeak and entirely different from that of its larger relatives.

The extinction of the Oahuan species of the genus is a most singular fact, when one considers that *P. lanaiensis* was found so commonly in the much smaller forest area of Lanai, and on Molokai still remains in spots whence the other native birds have vanished. It may be, however, that the Oahuan bird had very special habits, as appears to be the case with the small Kauai species, and that for this reason its range was also very limited. The fact that it does not seem to have been observed by any of the old collectors except Bloxam would lead one to suspect this to be the case. I believe that a *Phaeornis* also formerly inhabited Maui, for I was assured by a native who was familiar with the birds that thirty years ago the Amaui was abundant in the Iao valley, and he particularly mentioned and described the song. If this was so, the causes of its extinction are even more inexplicable than are those which destroyed the Oahuan species.

(1) *Phaeornis obscura*, Gmelin.

HAB. Hawaii; generally distributed and common.

(2) *Phaeornis lanaiensis* Wilson.

HAB. Lanai and Molokai, in the mountain forests, common.

OBS. Rothschild credits this bird to the 'lowlands' of Lanai, meaning no doubt the lower part of the forest, which is far removed from the lowlands, where no *Phaeornis* could exist.

(3) *Phaeornis oahuensis*, Bloxam.

HAB. Oahu formerly; now extinct.

(4) *Phaeornis myiadestina* Stejneger.

HAB. Kauai; generally distributed and common.

(5) *Phaeornis palmeri* Rothschild.

HAB. Kauai, on the high plateau. Local and not common.

MUSCICAPIDAE.

CHASIEMPIS Cabanis.

Native name *Elepaio.*

There are three known species of this peculiarly Hawaiian genus of fly-catchers, one restricted to each of the forest-bearing islands at the north-western extremity, Oahu and Kauai, the third to Hawaii at the other end of the group. On the three intermediate islands the genus is not represented. Similar instances of partial, where one might expect universal distribution are found not only amongst other genera of birds, but in the molluscs and insects are even more remarkable. The universal distribution over the islands they severally inhabit, from the lowest bounds to the uppermost edge of continuous forest, as well as their extreme abundance and obtrusive familiarity, has caused these birds to be noticed by many persons who have seen no other native bird, so that one is not infrequently questioned by the city resident, who has wandered up the mountains close to Honolulu, about the little brown bird which "looks like a wren." Conditions of climate and environment are as nothing to the Elepaio, which is equally at home on the sharp ridges of Oahu, the boggy summit of Kauai, the dry uplands of Kona, or the rain-soaked forests of windward Hawaii. Nor in any locality is its presence restricted to any special feeding ground, from the tops of the loftiest Koa or Ohia it descends even to the ground, and abounds throughout the underbrush. Fallen trees are often carefully inspected, and it is said that from the actions of these birds the native canoe-makers judged of the soundness of the timber they had felled, ascribing to the Elepaio the rank of a deity.

As the whole forest is its hunting ground, so the food of the Elepaio is very varied, for it not only picks out larvae from unsound timber, and hunts for these along the limbs of large trees, but catches the more active insects which settle on the foliage, readily pursuing on the wing those that fly, and often taking them with an audible snap of the beak. Beetles, mature or as larvae, myriapods, flies, moths, caterpillars, especially loopers or span-worms, but also many others, such as those of the large wood-eating Tineids, gaudily-coloured ones of some native Pyralids, together with spiders and slugs, form the bill of fare. Large moths they often hold down in their claws while they tear off the wings before swallowing them. In pursuit of such food they are active the whole day through, and their restless movements and clear whistle enliven parts of the forest, which are now otherwise almost destitute of bird life. To the changes wrought by civilization they are less susceptible than any other bird, and they may be seen feeding and even nesting in dense thickets of the introduced guava, or amongst masses of the prickly lantana, as contentedly as amongst the native vegetation. I have often noticed them in the uplands of Kona feeding or sporting amongst the dry fallen foliage of the Koa around the base of the trunk, and in some localities in Oahu they frequently alight and feed amongst the creeping ground ferns as well as on the stems and leaves of the large tree ferns.

When not engaged in feeding or nesting they may often be seen chasing one another on the wing, either two or several individuals taking part in the sport or struggle, and scolding vociferously. The young are particularly tame and curious, and in some parts of the forest it is hardly possible to proceed far without one, two, or several of these coming up to view the intruder. In such cases they know no fear, and will sit around sometimes within arm's length, turning this way and that to make a thorough inspection. Sometimes the inspection is made in silence, but more usually with abundant chattering or scolding which is taken up by others in the vicinity. Not rarely, when their excitement is intense, from the scolding note they burst forth into their full song. This consists of three or four whistled notes, and is excellently expressed by the word " Elepaio," the stress falling on the penultimate syllable. These notes are very clear, so that even across the deep and large gulches of Oahu one can hear the birds on either side responding one to another.

Of all the known nests of Hawaiian birds that of the Elepaio is perhaps the most ornate, and it is by far the most easily found. Individual nests exhibit much variety in size. Of two taken from adjoining trees in the Kona district of Hawaii, containing eggs and young respectively, one was about three times as high as the other, two-and-a-half times as high as wide, and had the appearance of three superimposed nests, but the cavity was only of the normal depth. These nests are built in all sorts of situations, and the height at which they are placed varies much, being generally from 6 ft. to 40 ft. from the ground. I have seen many nests even in the introduced guava bushes both in Hawaii and Oahu. The abundant use of lichens in the construction, which are bound together with cobwebs, gives them a very beautiful appearance. The eggs are whitish, variably marked with reddish spots. Those nests which I have myself observed have always contained two eggs or two young at most, but Henshaw says that sometimes three eggs are found in a nest. Not very rarely the female may be found breeding when it is clothed in immature plumage, and before any trace of the white spots which take the place of the yellowish marks of the young has appeared. In one instance I found both parents in the immature plumage at a time when their young were already pretty well fledged, though still unable to fly. The old males, particularly those of the Hawaii[1] species, when in their finest plumage, have a very attractive appearance, especially when they assume their characteristic attitude, drooping the wings, and raising the expanded tail feathers vertically over the back.

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[1] For local variation in colour of plumage see Henshaw in 'The Auk,' July 1902.

(1) *Chasiempis sandvicensis*, Gmel.

HAB. Hawaii; generally distributed and abundant.

(2) *Chasiempis gayi* Wilson.

HAB. Oahu; generally distributed and abundant.

(3) *Chasiempis sclateri* Ridgw.

HAB. Kauai; generally distributed and abundant.

DREPANIDIDAE.

Remarkable as are some other members of the Hawaiian Avifauna, yet it is upon the Drepanid birds that the interest of the ornithologist will always be centred. The Drepanididae, as here considered, include thirty-five species, belonging to no less than seventeen genera. One genus with one species is restricted to the outlying island of Laysan, as is also a second species not generically peculiar, both being included in these remarks on the family, although with the rest of the Laysan Avifauna they may be excluded from the list of Hawaiian forms. The total number of species here cited is rather less than that given by the latest writers on the Archipelago, owing to the fact that several forms which have been described as distinct appear to be quite unworthy of such rank.

1. Small proportion of Species as compared with Genera.

If we compare the Drepanid birds with the peculiarly Hawaiian families in other groups of animals, we are at once struck by the very large number of genera accepted, as compared with species. No doubt this is partly due to the very different value attached to characters supposed to be generic by systematic workers in different lines, and also to the large size of birds as compared with many other creatures, owing to which their characters are obvious on the most casual inspection. If we compare the Drepanididae with such a family as the Proterhinidae in the Beetles, which is also peculiar[1] to the Hawaiian Islands, we do not find the latter susceptible of easy division into well-marked genera as in the birds; indeed, at present the members are all included in a single genus. Yet to the student of both groups it is obvious that the extreme forms of the Proterhinidae exhibit differences of structure as great and varied as are found in the extreme forms of the Drepanididae; in fact the variety of structure is probably greater in the beetles. If, however, we were to reduce the hundred and thirty species of *Proterhinus* to the number of species of the Drepanid birds, and particularly if in doing so we were to eliminate the osculant forms, it is manifest that the condition of the two groups would be strikingly analogous. It is therefore in my opinion clear that, making all allowance for the ease with which the one group is studied, and the relatively great difficulty presented by the other, there is a real and great difference between the Drepanididae and the Proterhinidae, and in fact between these birds and most of the other extensive and peculiarly Hawaiian groups of animals, and that the difference is due to the fact that while in the birds there has been a keen competition for existence between the various species and between the individuals of each species, in the Proterhinidae there has been little or none, because the food-supply of the latter, consisting of dead wood, is in a forest-covered country almost unlimited. As will be hereafter noticed, there is good reason to believe that the competition between the birds has been much more keen in past times than during the more recent periods of their existence.

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[1] Since this general account of the Drepanididae (for the most part reproduced from the 'Ibis' for Oct. 1901) was written, I have discovered that a species of *Proterhinus* is found in Samoa.

2. Origin of the Drepanididae doubtful.

If we compare the Drepanididae with other families of birds, it is obvious that, considering the few species that exist, they exhibit an unusual diversity of structure. As a proof of this, it is only necessary to mention the fact that competent ornithologists have repeatedly assigned to different families even those forms which without any possible doubt belong to the same. This diversity of structure must have required a vast time for its evolution, and the period at which the ancestral Drepanid immigrated to the islands must have been very remote indeed. Whether all the existing species of this group have been evolved from one original immigrant or from more we cannot say; but the former view is probably the more correct, although two ancestral immigrants might be admitted.

That the islands were originally stocked by *numerous* species which produced the present family is highly improbable, seeing that whole families of birds far better adapted to cross wide extents of ocean were quite unrepresented in the Hawaiian Islands, although we know that some of them thrive exceedingly when imported, and many others would no doubt do so under similar circumstances.

Whence the ancestors of the present Drepanid birds came is, owing to their dubious relationships with outside forms, still an open question; though if it were certain that their closest relationship was, as Dr Gadow has suggested, with the Cœrebidæ, little doubt would remain as to their American origin. For the present it is perhaps safer to consider them, with other peculiarly Hawaiian groups, as being of unknown origin.

3. Two Groups of Hawaiian Drepanid birds exist, indicating either two distinct original immigrants or, more probably, very early divergence from one ancestor in two directions.

I have already stated that a dual origin for the present Drepanididae is conceivable, and is indicated by the fact that they fall clearly into two groups. The first of these contains six genera, viz. *Drepanis*, *Drepanorhamphus*, *Vestiaria*, *Himatione*, *Palmeria*, and *Ciridops*; the second the remaining eleven.

The genera of the first group are characterized by the truncate apices of the primaries, except in the anomalous *Palmeria*, and by the plumage of the young, which is always partly black or of a dull colour. In the adults white markings are present, either on the wings or on the upper parts of the body. The skin, moreover, is comparatively thick, and sometimes extremely tough and thick, as cannot fail to be noticed by the collector when using very small charges of powder and shot to procure specimens. The plumage of the sexes is identical or nearly so. Red colours are acquired by the adults of some species in both sections, but in a totally different manner; in the second group it is invariably through a green or olivaceous stage, while green-plumaged forms are never found in the young of the first group. In addition it may be noted that the songs and cries of the members of the first section are of a very different character from those of the second, between most of which there is a striking general resemblance in this particular. Further, all the members of the former which are known to me in life (*Himatione*, *Vestiaria*, *Palmeria*, and *Drepanorhamphus*) have a peculiar, noisy flight, so that the sound caused by their wings, when they fly freely, can be heard at a long distance.

In the second group the primaries are never truncate at the apex; the young, moreover, are invariably clothed to a large extent in green or olivaceous plumage; and this colour nearly always persists in the adult female, although it may be totally lost in the adult male. Such is the case in several species of *Loxops*, the green coloration in this genus being largely permanent in the male of the Kauaian species only (*L. caeruleirostris*). There are almost always well-marked distinctions of colour between the adults of either sex. In a few forms which retain in the adult male and female the green plumage characteristic of immature birds (e.g. *Viridonia* and *Chloridops*) there is little or no difference in the colour of the sexes; but very rarely is this the case when the adults acquire a special coloration, as in *Loxioides*, in which the head is yellow, though somewhat less brightly coloured in the female.

To those who believe in the great significance of the very different character of the coloration of the young birds in these two groups (whatever change may take place in the adults), as well as of the development of striking sexual characters throughout nearly the whole of one of them, the necessity of distinguishing clearly between them will be apparent.

4. Development of Species in each Group along similar lines, and the reason for the same.

When we examine, side by side, a full series of the forms it is obvious at a glance that each group has developed along similar lines. *Himatione* and *Palmeria* of the first are in general structure very like *Chlorodrepanis* and *Viridonia* of the second; *Drepanis* and *Drepanorhamphus* resemble *Hemignathus*; *Ciridops* may be compared with *Loxops*.

With *Ciridops* in one direction the evolution of forms in the first group ceases, while from *Heterorhynchus* the second proceeds through *Pseudonestor* to a series of thick-billed birds quite unrepresented in the first. Consequently in discussing these remarkably analogous forms the six thick-billed genera will here be excluded. Turning to the habits of the birds of the remaining twelve genera, eleven of these certainly and all probably (the habits of *Ciridops* being little known) contain at least some species accustomed to feed on nectar[1]. *At the present time* the main supply of this food is derived from the *Metrosideros*—the well-known "Ohia-lehua" of the natives, and the predominant tree in the forests of all the islands. Around the masses of red blossoms of these trees may be seen at the proper season an assemblage of various kinds of birds, the scarlet "Iiwi" (*Vestiaria*) and the green or yellow "Akialoa" (*Hemignathus*)—both with long curved beaks,—the crimson "Apapane" (*Himatione*) with moderate straight bill, and the green "Amakihi" (*Chlorodrepanis*) with moderate curved bill. The observer wonders for what purpose such extraordinary developments can have taken place. On the same flowers are numerous bees peculiar to the islands, shortest of all short-tongued bees, with a tongue one millimetre long, yet as well able to feed on the nectar as the "Akialoa" with its tongue of two inches or more. An examination of the *Metrosideros* tree will show that it is a species not peculiar to the islands, although, as above remarked, it forms so large a part of the whole forest. In its specific characters it is in a remarkably unstable condition, exhibiting many striking variations, as though it were now in process of being differentiated into several species. Many of these variations are of constant occurrence and widely spread; some are deemed worthy even of specific rank.

These facts appear to me to point to a comparatively recent "immigration" of this tree, and I cannot suppose that it has existed on the islands for the period of time which would have been necessary to produce the exceptionally great variety of structure exhibited by the Drepanididae. Turning to other sources whence the food-supply may have been derived at a period antecedent to the arrival and spread of the "Ohia-lehua," we find very different conditions. All[2], or practically all, the plants visited by these birds for food had bell-shaped or tubular blossoms, in which the nectar was more or less hard to reach. Of these tubular-flowered plants there are several predominant genera, some of which are themselves restricted to the islands, and belong to various families, comprising hosts of peculiar species. Most striking of all are the arborescent Lobeliaceae, not closely related to forms found in other countries. The multiplicity of these peculiar plants, and their isolation from foreign forms, bears a striking resemblance to that of the Drepanid birds themselves, indicating likewise an extremely ancient occupation of the islands; and as the latter are the pride of the Hawaiian ornithologist, so are the former of the Hawaiian botanist. To these flowers Drepanids of both sections are still partial, and some particularly so, and the development of their extreme forms is not comprehensible without a knowledge of the island flora. That there has been in the past severe competition for food between the various species which have similar habits, and between the individuals of each, cannot be doubted. The number of birds that can exist in a given area is obviously only that which can be supported when the food-supply is at a minimum. At the present day, when the "Ohia" is in bloom over miles of country, the food-supply seems inexhaustible; but between the flowering periods it is limited, and often leads to a decided migration of the birds either from one district to another, or to different elevations in the same district, where, owing to the varying climate, the trees blossom at different seasons. Certainly the arrival of the "Ohia" must have been a powerful agent in the increase of individuals of honey-sucking species; and the competition for food must have been much more keen previously. I can hardly doubt that the primitive Drepanid was a honey-sucker, and that the now purely insectivorous, as well as the thick-billed frugivorous forms, were a later development, although the honey-suckers were no doubt at all times partly insectivorous, as they are at present. With the increase of the insect-fauna there would certainly be a tendency among the honey-sucking forms to become more largely, or even entirely, insectivorous, as in fact has been the case. The examination of a series of species of the Lobeliaceae will show great differences in the length of their flowers; and while in some the nectar can be reached by the moderate tongue of *Chlorodrepanis*, in others it can only be procured by the extremely long-billed and long-tongued forms of Drepanids, and the long-tongued Meliphagine "Oo," the latter also a peculiar and probably very ancient denizen of the islands.

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[1] Not that nectar is ever the sole food, though a most important source of nutriment—so important to the adults of some species that at certain seasons no individual shot contains any trace of insect food. Few Hawaiian insects frequent flowers, and such as do, viz. one or two beetles and the Hymenoptera, are seldom if ever found in these birds' stomachs. Nectar is undoubtedly absolutely necessary to the existence of *Himatione*, *Chlorodrepanis*, *Vestiaria*, *Hemignathus*, and *Drepanis*, as they are constituted; small moths, caterpillars, and spiders—their other food—would certainly fail them in sufficient quantity at certain seasons. The honey-sucking Drepanids and the "Oo" can be kept alive on nectar and sugar-cane juice. When a species becomes purely insectivorous here it shows extreme modification, e.g. *Pseudonestor* and some *Heterorhynchi*, so that it may obtain special insects inaccessible to other forms.

[2] We exclude from consideration the *Eugenia*, a local species, the blooms of which are superficially like those of *Metrosideros* and are attractive to birds; it is known outside the islands, and was probably introduced by the early native settlers.

A series of observations made on one of the most superb of the Lobeliaceae showed that it could only be fertilized by these highly specialized birds. In this species the pollen is mature before the stigma is exserted, by which time the pollen has vanished. The latter cannot be wind-borne, because it is shed in a viscid mass on contact, and so is constantly deposited on the bird's forehead, from which it is difficult to remove it. With these considerations in view the cause of the development of the most remarkable forms in each group of birds becomes manifest, and this cause has produced *Hemignathus* in the one, and *Drepanis* in the other, so like one another in general structure, while really but remotely allied. How easily the extraordinary lengthening of the bill, to which the resemblance is mainly due, may have taken place, side by side with the increasing length of the tubular flowers, is apparent from the fact that in some of the birds there is even now individual variation in this respect. It should also be stated that in immature specimens the beak is much shorter, and that in the freshly-hatched young of *Chlorodrepanis* it is a short, wide member, instead of having a slender curved form, as in older birds. In the long-billed forms the mandibles are almost invariably shorter in the more "conservative" females, which in my second group retain in the adult the more primitive coloration of the young, though the males assume a totally different dress.

5. Transition from a largely Vegetable Diet to purely Animal Food.

Of the genera *Loxops*, *Oreomyza*, and *Heterorhynchus* the members are mainly insectivorous, but each comprises some species which at times feed on the nectar of flowers. In *Loxops* and *Heterorhynchus* the tubular character of the tongue is fully preserved, yet they very rarely feed from flowers, and some of the species perhaps never do so. Certainly that of the latter genus which is found on Hawaii is purely insectivorous, feeding, after the manner of a woodpecker, on beetles and other insects; but the other three allied species are less adapted to such a life, and the Maui form has been known to me to visit blossoms as a very rare occurrence, while the partiality that the extinct species of Oahu had for banana flowers has been noticed by others. That these birds, even when purely insectivorous, still retain the characteristic Drepanid tongue, is clearly due to the fact that it remains a most efficient organ for obtaining insect food—in *Heterorhynchus* for extracting the wood-boring beetles of which it is so fond; and in *Loxops* for securing caterpillars which live in the terminal buds of some forest trees, not to mention other purposes. In *Oreomyza*, on the other hand, the tongue is much degraded from its normal structure, while only two of the species, and those but on the rarest of occasions, have been seen to suck honey, and then only from the shallow "lehua" flowers. The genus is almost entirely insectivorous and feeds chiefly on exposed caterpillars, spiders, and moths.

6. The Thick-billed Species of the Second Group.

There still remain to be considered the thick-billed species of the second division of the Drepanididae, which have no similar forms in the first.

There are seven such forms, distributed in no less than six genera, one of the latter (*Psittacirostra*), with its single unmodified species, ranging over the whole group of forest-bearing islands. One species forming a distinct genus (*Telespiza*) is restricted to the outlying island of Laysan; another, also forming a genus (*Pseudonestor*), is found only on the mountain of Haleakala in Maui; while three genera with four species are confined to the large island of Hawaii, namely, *Rhodacanthis* with two species and *Loxioides* and *Chloridops* each with one. It is now generally conceded that all these forms are only extreme modifications of the more normal Drepanididae. In my published biological notes it is true that I placed this section under the Fringillidae, but I did so merely in deference to the opinions of systematic workers, Messrs Wilson and Evans and Rothschild, and more particularly to those of Dr Gadow, who had availed himself of the opportunity of carefully studying the different forms side by side, whereas at that time I had secured no such facilities. Personally I was convinced that all belonged to one family—whether called Drepanididae, Fringillidae, or otherwise,—and always maintained this in my correspondence against general opposition, and that too at a time when Mr Rothschild himself was setting forth descriptions of the Drepanids under such diverse families as Fringillidae and Meliphagidae! Although biological considerations first suggested to me the common origin of all the present family—honey-suckers and thick-billed birds alike—yet at a very early period[1] of my study of these birds I had excellent reasons apart from such for my belief. Before the body of the first *Pseudonestor* obtained by me was cold I was well aware that its tongue was essentially Drepanine and little modified, and that it indicated a positive connecting-link between the thick- and thin-billed sections, being, in fact, more typically Drepanid than that of the otherwise normal *Oreomyza*. The tongue of *Psittacirostra* likewise was taken from the bird immediately it fell to show that it was truly Drepanid, although much modified. In a hot country such parts should always be preserved immediately, as after a day's collecting they are liable to dry up and their appearance to become changed. The characters afforded by the nostrils and their opercula in all the important forms, as well as the pattern of colour, had been under my consideration as early as 1894, and it is doubtful whether any other important characters have been advanced since that time.

It is still my belief that the biological or physiological reasons on the strength of which I first concluded that all these birds belonged to one family are of the utmost importance, chief amongst which is the peculiar odour to be noticed in both groups, in the thin-billed and thick-billed forms alike. So far as Hawaiian birds are concerned this odour is absolutely restricted to the Drepanines. Mr Rothschild in his work on Laysan makes the astonishing statement that the Meliphagine Oo has a similar and even more powerful odour; but this is only one of those errors which, for want of due care, the museum naturalist is liable to make in opposing facts ascertained and proved in the field.

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[1] It should be mentioned that a long time previously Dr Sclater (cf. "Ibis," 1871, p. 559) had, after a careful study of various Hawaiian forms, expressly declared his opinion that two of the Finch-billed genera (*Psittacirostra* and *Loxioides*) were true Drepanids and related to *Heterorhynchus*—an opinion without doubt correct, since *Pseudonestor* is a connecting-link. It was not until long after I had come to the conclusion that not only these but also the most thick-billed genera were decidedly Drepanid, that Dr Sclater's views became known to me.

The explanation is very simple: the Oo (*Acrulocercus*) freshly killed or alive[1] has no such odour. The specimens supposed to possess it had no doubt been enclosed in boxes with Drepanids, or when collected in the field had been placed in a bag with them, and had thus become impregnated with their odour.

This odour, as I have pointed out in my former notes, cannot be acquired from the food, because it it found in forms of such diverse habits—*e.g.* in *Drepanorhamphus* at times when it is feeding solely on the nectar of flowers, in weevil-eating *Heterorhynchus*, in *Psittacirostra* when it is devouring the red fruit of *Freycinetia*, in *Chloridops* when the sole contents of the crop are the seeds of the bastard sandal. Neither of the Meliphagine birds nor the Flycatchers, when feeding in the same trees and on the same food as Drepanids, possess any such smell All these facts point to the odour as being an ancestral character in the Drepanididae.

In this connexion it may further be remarked that the song of the thick-billed *Pseudonestor* is practically identical with that of the various species of *Heterorhynchus*, which have always been allowed to be Drepanids, and that *Telespiza*, living isolated on the island of Laysan hundreds of miles distant from its allies, has a song similar to this. I shall not easily forget my astonishment when I first heard it on passing a house in Honolulu, and found on enquiry, not the expected *Heterorhynchus*, but *Telespiza*! Possibly the latter may have other notes, but the fact remains that the song I heard was note for note the same as that of the former species, and I heard it repeatedly.

7. Cause of Frugivorous Habits in the Thick-billed Drepanididae.

The thick-billed frugivorous Drepanids, like the purely or almost purely insectivorous members of the family, have no doubt assumed their frugivorous habits for the same reason that the latter have become insectivorous, viz., the competition for food, rendered unusually keen from the exceptionally small area of distribution. The development of the beak and the loss of the elaborate sucking-tongue have naturally followed. In this connection it is interesting to note that the rather strong-billed *Chlorodrepanis stejnegeri* of Kauai, so far as I know, stands alone amongst the brush-tongued forms in feeding freely on fruits; for at certain seasons it voraciously devours the berries of the poisonous *Wikstroemia*, in the same manner as *Phaeornis*. Such a species—becoming more and more frugivorous and abandoning flowers for fruits—may be considered as potentially the ancestor of a new series of thick-billed forms; at present it is largely a honey-sucker, largely insectivorous, and on occasion largely frugivorous. A line may be traced among the thick-billed forms through the purely insectivorous *Pseudonestor* to the largely frugivorous, but still largely insectivorous, *Psittacirostra*, to end in *Chloridops*, which has become almost entirely frugivorous.

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[1] The writer has on more than one occasion had *A. nobilis* alive.

8. Distribution of Genera in the Islands.

The distribution of the genera within the group is very unequal, only five of the eighteen having a range which covers all the islands that are forest-clad. These are *Vestiaria*, *Himatione*, *Chlorodrepanis*, *Oreomyza*, and *Psittacirostra*. Three others, *Hemignathus*, *Heterorhynchus*, and *Loxops*, are found on four islands, a species of each inhabiting Kauai and a second Hawaii, the two extreme forest-bearing islands of the Archipelago. One, *Palmeria*, inhabits only Maui and the neighbouring island of Molokai. *Drepanorhamphus* is peculiar to Molokai, *Pseudonestor* to Maui, *Telespiza* to distant Laysan. Hawaii has no less than six genera peculiar to itself—*Drepanis*, *Ciridops*, *Viridonia*, *Loxioides*, *Rhodacanthis*, and *Chloridops*.

9. Distribution of Species.

The distribution of the species is fully given in the table (p. 390). One form, *Heterorhynchus lucidus*, is almost certainly extinct, while several others, if not extinct, are so extremely rare as to be very nearly so. On examining the table of distribution it is at once noticeable that the birds may be divided into two very strongly contrasted classes. Thus *Oreomyza* is represented by a distinct species on each of six islands, as are also *Hemignathus*, *Heterorhynchus*, and *Loxops* on each of four. On the other hand, *Himatione*, *Vestiaria*, and *Psittacirostra* range over the whole main group, each with a single unmodified species. *Chlorodrepanis* occupies an intermediate position with two very distinct forms on Kauai, and another form, sometimes considered divisible into three or more species, ranging over the remaining islands. Of these, however, the distinguishing characters are so slight that it is questionable whether they are worthy even of subspecific rank, and in any case such characters are by no means to be considered equivalent to those which separate the different species of *Oreomyza*. The latter are clearly the results of isolation, one island having been colonized by a species from another, which has subsequently acquired peculiar characters. It might be supposed that the birds in the other class, which shew no change on the various islands, are in some way less susceptible to the effects of isolation and change of environment. Probably this is not the case, and the true explanation is to be found in considering the habits of the members of the different genera.

Himatione, *Vestiaria*, and *Psittacirostra* are all birds which take extensive flights, often at a great height in the air, and frequently form small companies in these flights. If we stand on the main ridge of some of the islands the birds may be seen passing high overhead from leeward to windward or vice versâ. All freely traverse open country, in passing from one feeding-ground to another. Consequently when storms arise they are extremely likely to be carried across the channels between the islands, and no doubt

Table of the Distribution of the Species of the Drepanididae.

	HAWAII.	MAUI.	MOLOKAI.	LANAI.	OAHU.	KAUAI.	LAYSAN.
Drepanis …………	*pacifica*						
Drephanorhamphus	……	……	*funereus*				
Vestiaria …………	*coccinea*	*coccinea*	*coccinea*	*coccinea*	*coccinea*	*coccinea*	
Palmeria …………	……	*dolii*	*dolii*				
Himatione ………	*sanguinea*	*sanguinea*	*sanguinea*	*sanguinea*	*sanguinea*	*sanguinea*	*freethi*
Ciridops …………	*anna*						
Hemignathus ……	*obscurus*	……	……	*lanaiensis*	*ellisianus*	*procerus*	
Heterorhynchus …	*wilsoni*	*affinis*	……	……	*lucidus*	*hanapepe*	
Pseudonestor ……	……	*xanthophrys*					
Viridonia…………	*sagittirostris*						
Chlorodrepanis …	*virens*	*virens*, var.	*virens*, var.	*virens*, var.	*virens*, var.	*parva* and *stejnegeri*	
Loxops ……………	*coccinea*	*ochracea*	……	……	*rufa*	*caeruleirostris*	
Oreomyza…………	*mana*	*newtoni*	*flammea*	*montana*	*maculata*	*bairdi*	
Psittacirostra ……	*psittacea*	*psittacea*	*psittacea*	*psittacea*	*psittacea*	*psittacea*	
Loxioides …………	*bailleui*						
Telespiza …………	……	……	……	……	……	……	*cantans*
Rhodacanthis ……	*palmeri* and *flaviceps*						
Chloridops ………	*kona*						

this often happens. The birds of the other class, such as *Hemignathus*, *Oreomyza*, *Heterorhynchus*, &c., do not take these extensive flights, but keep closely to the forest, very rarely—and most of them never—venturing into the open. Very seldom would they be likely to get blown across from one island to another. In short there is little doubt but that individuals of *Vestiaria* and its class are transferred from one island to another sufficiently often to prevent any true isolation, which is not the case with the other class. Who can fail to believe that a *Loxops* or a *Hemignathus* would have prospered on Molokai had they ever reached that island? Although *Himatione* ranges unchanged over six islands, yet after, by some remote chance, reaching the very distant Laysan it has there developed into a distinct form; and the case of the two extreme forms of *Chlorodrepanis* on the rather distant island of Kauai is also greatly in favour of my hypothesis.

That any of the Drepanid birds cross even the narrowest channels between the islands *willingly* is not to be thought of. In times of storm they are often blown down to the lowlands, sometimes in considerable numbers, in which case they mostly fail to regain the forest and perish after a few days. The only birds that I have myself picked up dead (sometimes in numbers) on the coast after these storms are of the genera *Vestiaria*, *Himatione*, and *Psittacirostra*; in fact, the very forms which by their habits are most liable to be carried away by the wind. Further, it is well known that, after stormy weather, the two former sometimes reach the bare island of Niihau, across the considerable channel which separates it from Kauai, but they cannot live there long on account of its unsuitable nature. No doubt the majority of these unwilling emigrants perish, but it is certain that those blown from a high elevation on one island must not infrequently land in suitable forest-country on one of the others.

There is however another possible explanation of the general distribution over all the islands of the single unmodified species of each of the three genera, *Himatione*, *Vestiaria*, and *Psittacirostra*. The plumage of all these was used by the natives in their feather-work, and the birds themselves were frequently kept alive in captivity to serve as decoys. It might therefore be contended that the bird-catchers established these species on those islands from which they were originally absent. Opposed to this theory are the facts already given, and especially the fact that the red birds are known in time of storms to be occasionally transported from Kauai to Niihau, across a channel not much less formidable than any of the other channels, excepting that between Oahu and Kauai, and wider than some of the others. Moreover had the natives been in the habit of making such transportations one can hardly doubt that they would have established the Mamo (*Drepanis*) on other of the islands, since it could easily be kept alive in captivity. One can only wonder that this was not done, if not in the earlier times, at least at a later period when the whole group was under one sovereignty.

10. Richness of the Island of Hawaii in peculiar Forms.

The relative richness in birds of Hawaii, with its eleven peculiar species and no less than six peculiar genera, is manifest and interesting, since in other groups of animals with highly peculiar species it is frequently (though not invariably) extremely poor, as compared with the older islands of the group. Probably its large area and very varying climate has favoured the multiplication of peculiar forms, while it must not be forgotten that, owing to its position at the end of the group of islands, it is incapable of sending forth emigrants except in one direction. That this is of importance is rendered more likely from a consideration of the Drepanids of Kauai, at the other end of the group of forest-clad islands. Kauai, it is true, has no peculiar generic forms, although geologically so much more ancient than the large island; but being the most distant of the group, as well as at one extremity of the series of islands, its two species of *Chlorodrepanis* are by far the most isolated, its *Hemignathus* and *Loxops* are similarly circumstanced, while in the Meliphagines its *Acrulocercus* is very different to the other forms, which are closely allied inter se, and in the Turdidae it has the two extreme forms of *Phaeornis*. No doubt its small area and comparatively constant climate tend to render it much less rich in Drepanids than Hawaii.

11. Extreme Specialization of many Forms of Drepanid Birds.

If, as is natural, we consider the primitive form of Drepanid to have been structurally very similar to such birds as are now comprised in the genera *Himatione* and *Chlorodrepanis*, and side by side with these place such forms as *Loxops*, *Drepanorhamphus*, *Heterorhynchus*, and *Chloridops*, the remarkable specialization of the latter is at once apparent, though we are still able to examine connecting forms. To me this specialization indicates the severe competition that has taken place between the Drepanids in past ages. When a vast portion of the food-supply was derived from the blossoms of flowers, and this source of food, as I have shown, was relatively small to what it became later, change to a purely insectivorous, or largely frugivorous, diet must have been very advantageous to the individuals concerned, and the greater the specialization which resulted in obtaining some particular food (provided that it was sufficiently abundant), the greater the advantage to the species. To the field-naturalist who has examined many specimens of such a form as *Pseudonestor* at various seasons and found that its food consists essentially of the larvae of a group of longicorn beetles peculiarly Hawaiian, and not less remarkable than the Drepanids themselves; who has seen how perfectly modified it is for obtaining these; how perfectly adapted is the bill of such a form as *Drepanorhamphus* for obtaining the nectar from the deep tubes of the giant-blossomed Lobeliaceae, inaccessible to other birds; how wonderful is the form of *Heterorhynchus*, which delights in the hard boring weevils, themselves equally noticeable; how powerful are the muscles of the head and beak of *Chloridops*, which can crack the stones of the ripe fruit of the bastard sandal; the extraordinary advantage of this specialization in each form for acquiring a constant supply of food almost or quite inaccessible to its allies, and that too in a country where the small land-area may be supposed to have rendered competition unusually keen, must appeal with the greatest force.

12. High Specialization may become a Source of great Danger.

This high degree of specialization, although of the greatest benefit under stable conditions, with a change of these obviously becomes a source of great danger. Thus, destroy the special food-supply of the birds mentioned above, and there is little doubt but that most of them would very quickly become extinct; for forms so perfectly adapted for special ends are, under ordinary circumstances, but ill-adapted to change their mode of life; and it is amongst such forms that most of the rarest species are found, while a considerable number of them already verge on extinction. It is probable that this state of things has largely been brought about by man, and in particular by the destruction of the lowest forest. Even now, in winter storms, large numbers of birds resort to the lowest skirts of the existing forest, generally at an elevation of 1200—1500 feet; and it is well known that in Cook's time such forms as *Psittacirostra*, *Himatione*, and *Chlorodrepanis* actually came down to the coast in Kealakeakua Bay, though now such flights would mean death to the visitants. Moreover, at these lower altitudes the flowering-season of most plants is different from that in the uplands, and they must have been an important source of food at seasons when it was scarce elsewhere.

13. Other causes of extinction of Hawaiian Birds.

Although the destruction of the lowest belt of forest over by far the greater part of the islands has, in my opinion, been a most efficient cause of the destruction of native birds, many other causes have been at work, all of which are due to the occupation of the islands by white men. Such causes are the introduction of cattle and goats, which have extirpated or very much thinned out great portions of the native forest; of cats, foreign rats, and the mongoose (which are direct enemies), as well as of the mynah, which not only attacks and drives away other birds, but also devours their eggs and young. The disturbance caused by the entrance of cattle into untrodden forest appears to be alone sufficient to scare away some species. Thus, on a very rough lava-flow on Hawaii in 1892, the "Oo" (*Acrulocercus nobilis*) was very numerous, and as many as a dozen of these birds could be seen in a single tree, making, with hosts of the scarlet "Iiwi," the crimson "Apapane," and other birds, a picture never to be forgotten. A few years afterwards, on revisiting the spot at the same season, although the trees were, as before, one mass of flowers, hardly a single "Oo" was to be seen. The only noticeable change was that cattle were wandering over the flow and beginning to destroy the brushwood, just as they had already reduced the formerly dense forest bordering the flow to the condition of open park-land.

Cats were introduced into the Hawaiian Islands at a very early time, and, no doubt, increased excessively, while, as their owners moved from place to place, many strayed into the woods and began to feed on mice, rats, and birds. They are now found wild on all the islands, apparently only the wettest portions of the forest being free from them. On Lanai, in walking up a single ravine, I counted the remains of no less than twenty-two native birds killed by cats, and these must all have been destroyed within two days, as previously the whole gulch had been washed out by a heavy flood. Two cats were actually shot on this occasion as they were devouring their prey, and several others seen, but, owing to the fact that they are extremely shy and mostly nocturnal in habits, few people who have not lived much in the woods have any idea of their numbers. The common rat is also quite at home in the forests and is decidedly arboreal in habits, feeding on fruits, land-molluscs, and no doubt on birds. The mynah, which I have myself seen devouring both young and eggs of other species, has increased prodigiously, and probably exceeds in numbers the whole of the native land-birds put together. It has greatly extended its range through the forest since 1892, and on some of the islands is now ubiquitous.

14. Songs of Drepanid Birds.

None of the Drepanids can be considered first-class songsters. The "Ou" (*Psittacirostra*) and the "Palila" (*Loxioides*) are, when at their best, distinctly pleasing, and surpass all the others. The "Akialoas," especially *Heterorhynchus*, have a song full of vigour, yet not beautiful or sustained but always delightful to hear, as being an expression of the highest contentment. This energetic outpouring of melody is noticeable likewise in *Pseudonestor*, *Hemignathus*, and *Chlorodrepanis*, the songs of all of which, as also those of *Loxops* and *Oreomyza* (when it does sing), bear a general similarity to one another. *Pseudonestor* and *Heterorhynchus* have an identical song; that of *Viridonia* is the same as that of *Chlorodrepanis*, with two or three notes added at the end. *Rhodacanthis* whistles several notes, which to anyone walking through the woods might appear to be rather the utterance of a man than of a bird. The songs of the other group of Drepanids are quite different. That of the "Iiwi" (*Vestiaria*) is harsh in the extreme. The song of the "Apapane" is short, monotonous, and often repeated, but not unpleasing. It has a singularly plaintive call-note. The "Mamo" (*Drepanis*) and the allied form on Molokai have an identical cry, except that in the latter at its best it is probably much louder. The song of *Palmeria* is peculiar, as it makes a remarkable vibrating or gurgling sound. In spite of the dissimilarity in the normal songs or cries of the birds of this section, most of the different forms frequently utter calls or notes very similar to one another. They are more varied than the almost universal squeak of the call or alarm-note of the green-feathered section.

15. Native names of Hawaiian Drepanididae and some other birds.

The native names of the forest-birds are themselves of some interest, showing as they sometimes do the rudiments, as it were, of a crude, and often erroneous, classification. The names are certainly very aptly chosen, and their meaning is in most cases apparent to anyone with some knowledge of the language. They may be divided into several classes.

(1) Names given from peculiarities of structure or plumage, e.g. Akihialoa (*Hemignathus*) from its long, sharply-pointed beak; Nukupuu (*Heterorhynchus*) from its

hill-like (i.e. strongly rounded) bill; Palila from its aberrant *grey* plumage. Such names are often compounded with a- beak (lit. jaw) e.g. Akekee, Amakihi, Akohekohe.

(2) Onomatopoeic names, e.g. Alala (*Corvus*), Elepaio (*Chasiempis*), and Oo (*Moho* or *Acrulocercus*). Such names may have an applicable meaning as well as imitating the cry of the bird, e.g. Kioëa (*Numenius*), which is onomatopoeic and at the same time refers to the height at which the bird stands from the ground.

(3) Names derived from the nature of the sounds uttered by the bird, e.g. Apapane (*Himatione*), Akikeke (*Oreomyza bairdi*), Kakawahie (*O. flammea*), &c.

(4) Called after a person, Amaui (*Phaeornis*) Maui's bird.

(5) After colour of plumage and habits, Ula-ai-hawane (*Ciridops*), the red bird that feeds on the hawane (*Pritchardia*).

Some names appear to have been used as we should say generically, e.g. Iiwi (written also Iwi and Iawi), which was not only applied to the *Vestiaria* but certainly on Kauai and Oahu to the long-billed *Hemignathus*. Probably Iwi was originally a general name for the birds with long curved beaks other than those with largely black plumage which belonged to the genus Oo. So we have Iiwi polena, Iiwi popolo, and other names for *Vestiaria* in its various phases of plumage, such forms being considered distinct species by the natives. The name of 'Oo' seems similarly to have been applied to all the black honey-sucking species, for there is no reason to doubt the correctness of Cook's naturalists, who give the native name 'Hoohoo' for the Mamo, seeing that they, like the other early visiting naturalists, are invariably correct in the names given to the more obscure birds, although their spelling is frequently grotesque. Probably the full name was originally Oo mamo just as we have the Oo-aa, dwarf Oo, of Kauai, and the Oo-nukuumu, Oo with sucking-beak, of Molokai (*Drepanorhamphus*).

I may add that in the native names applied to the birds in this work I have in all possible cases adopted the spelling used in Andrews's Hawaiian Dictionary (1865), as often preferable to that used in recent ornithological works; and where names given by living natives do not agree with those given by the older natives to naturalists who visited these islands in the first half of last century I have invariably adopted the latter, the more recent names being often obviously corruptions of the older.

The subjoined list will enable anyone to distinguish at a glance the various genera of Drepanididae. More characters are frequently given there than are necessary for merely separating the different forms, especially where these characters appear to me to be of great importance. It is only necessary to add that the views expressed in these remarks on the Drepanid birds have not been formed off-hand, but are the results of much study and observation, extending over a period of ten years, six of which have been spent in the islands themselves, for the most part in the haunts of the various species. As the writer has had the opportunity of seeing many of the rarest forms—not a few individuals only, but scores or hundreds—he has had ample opportunity for careful study of the habits, without the need or desire to kill a valuable specimen whenever seen. For this reason the biological considerations may be held to be of more importance than would be the case were they based on a more superficial study extending over a short period of field-work.

Table of genera of Drepanididae.

1. (2) Apices of some of the primaries truncate, *or* if not truncate, then the front of the head bearing a large crest of narrow curved feathers, which overhangs the base of the beak.
Plumage of upper parts always partly black, the rectrices always black (sometimes white-tipped), the wings always at least largely so.
White markings always present in the adult, either on the wings or upper parts of the body, at times confined to the outer web of some of the primaries.
Young birds with body-feathers always of a black or dark obscure colour, either wholly or in part; when with many pale feathers (*Vestiaria*), then these are spotted with black .... DIVISION I.

2. (1) Apices of primaries never truncate; head never with a crest of narrow curved feathers.
Plumage of adults never in the least black above, not even the tail black.
Young birds never clothed with black or dark obscure plumage, nor black-spotted, but always largely green or olivaceous .... DIVISION II.

DIVISION I.

1. (6) Beak very long and strongly curved, as long as or longer than the metatarsus.
2. (5) Beak black, wholly or in great part; plumage mainly black or black and yellow. Feathers of throat not modified.
3. (4) Plumage black and yellow; nasal opercula not very long .... *Drepanis.*
4. (3) Plumage not at all yellow; nasal opercula very much elongated .... *Drepanorhamphus.*
5. (2) Beak entirely pale; plumage of adult scarlet, of young yellowish and black-spotted; feathers of throat much modified, narrow, and stiff .... *Vestiaria.*
6. (1) Beak never very long, straight or but little curved.
7. (8) A large crest of pale feathers curving over the base of the beak .... *Palmeria.*
8. (7) Head without a crest.
9. (10) Beak moderately long, sharply pointed; body-plumage not variegated with strongly contrasted colours .... *Himatione.*
10. (9) Beak rather Finch-like; body-plumage highly variegated .... *Ciridops.*

DIVISION II.

1. (4) Beak extremely long and one or both of the mandibles strongly curved, the upper one always so and very slender and delicate at its apical portion—so slender as often to be even slightly flexible.
2. (3) Upper mandible only a little longer than the lower, nasal setae altogether wanting .... *Hemignathus.*
3. (2) Upper mandible greatly exceeding the lower (by from $\frac{1}{2}$ to $\frac{1}{3}$ its own length), nasal setae well developed .... *Heterorhynchus.*
4. (1) Beak not of extraordinary length and much curved; if moderately long and curved, then the apical portion of the upper mandible not extremely slender and very little longer than the lower.

5. (14) Beak never of very robust form, like that of a Grosbeak, nor of heavy build, with the upper mandible conspicuously surpassing the lower; if (as in *Loxops*) the beak is short and like that of a small Finch, then the lower mandible is more or less distorted either to the right or left, the tail is elongated and conspicuously forked, and the birds themselves are of very small size.

6. (13) Tail more or less short, not long and distinctly forked; lower mandible not deflected; beak not short and robust, like that of a small Finch.

7. (8) Beak straight, long, and strong, about as long as the metatarsus. (No well-marked sexual distinctions in plumage of adults. Tongue long, brush-like, typically Drepanid.).. *Viridonia.*

8. (7) Beak curved or straight, if straight then much shorter than in 7.

9. (10) Beak more or less curved, generally distinctly so; nasal setae always present and well developed. Tongue typically Drepanid, long, and brush-like. (Well-marked sexual distinctions in plumage of adult, the male much brighter in colour.) .... *Chlorodrepanis.*

10. (9) Beak straight or not curved as in 9; distinct nasal setae or setiform feathers may be present or entirely wanting. Tongue abnormal, flattish, slightly cleft at the apex, not of the typical tubular brush-like form.

11. (12) Nasal setae or modified setiform feathers well developed, so as to be able to shield the whole length of the nasal openings. (Colour of sexes little differentiated.).. *Oreomyza.*

12. (11) Nasal setae or setiform feathers entirely absent, or at least very short and little developed, not able to shield the nasal openings. (Sexual coloration of adults markedly different.) .... *Paroreomyza*[1], subgen. nov.: type *Oreomyza maculata.*

13. (6) Tail elongated, distinctly forked at apex; lower mandible more or less deflected; beak short, but stout, like that of a small Finch. (Tongue typically Drepanid.) .... *Loxops.*

14. (5) Beak always strong, often excessively powerful and heavy, sometimes with the upper mandible conspicuously surpassing the lower. Robust birds, never very small.

15. (18) Beak with the upper mandible greatly or very greatly surpassing the lower in length, never very broad towards the base in dorsal aspect, more or less and sometimes very strongly compressed laterally. Body above with green plumage.

16. (17) Upper mandible very strongly flattened, or compressed laterally, and high. Tail very short, as in *Heterorhynchus*. Coloration of adults nearly similar in both sexes, each with only a yellow superciliary line on head. (Tongue not typically Drepanid, but more so than that of *Oreomyza*, rather elongated.) .. .. *Pseudonestor.*

17. (16) Upper mandible not very strongly compressed laterally, subcariniform. Tail not extremely short. Colour of adults dissimilar in the two sexes, the male with crown of head bright yellow. (Tongue degraded from the typical honey-sucking organ, but Drepanid characters still distinguishable.) *Psittacirostra.*

18. (15) Beak with upper mandible only slightly (though distinctly) surpassing the lower in length and more swollen laterally, often very much so, so that in most forms the nasal openings appear to be quite dorsally placed and the beak very broadly rounded above. Colour of plumage of body above not always green.

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[1] Herein I place also the other three species with sexual dimorphism.

19. (20) Beak strong, but not excessively powerful and heavy, much less so than in the following. Plumage of body above ashy grey in adults. Colour of sexes a little different, the yellow of the head in female less bright ......*Loxioides*.
20. (19) Beak excessively heavy and powerful. Plumage of body above not ashy grey.
21. (24) Upper mandible in dorsal aspect of very elongate triangular form. Upper and lower mandibles well adapted to one another. Male at least with the plumage of the head contrasting in colour with that of the upper parts of the body.
22. (23) Beak with cutting-edge of lower mandible distinctly and evenly curved on the apical part. Immature birds without dark spots above. (Very great differences in colour between the sexes when adult, the female remaining much like the young of either sex.)..............................*Rhodacanthis*.
23. (22) Beak with cutting-edge of lower mandible not distinctly and evenly curved. Immature birds with dark spots ....*Telespiza*.
24. (21) Upper mandible in dorsal aspect with the sides not very strongly convergent to the apex, so as to form a very elongate triangle. Cutting-edges of mandibles irregular, so that they are not perfectly adapted to one another. Plumage of head in neither sex conspicuously different from that of the body above. (No marked difference in colour of sexes.)......*Chloridops*.

The list of genera given above calls for a few remarks. In the first division the position of the abnormal *Ciridops* appears to me quite certain. Its characteristic black wings and tail, and the presence of white (not quite clear white) feathers, its scarlet plumage, to my mind so extremely like that of *Vestiaria*, and the blackish-grey feathers of the throat, so similar to what may be seen in *Palmeria*, leave no question as to its affinities. In the second division the ashy plumage of *Loxioides* appears aberrant at first sight, but it is noteworthy that others of the "green" section pass through a phase of plumage very similar to this (e.g. certain species of *Loxops*, &c.), which shows how easily it may have been acquired. *Telespiza* in the dark-spotted plumage of the young is also aberrant, but this condition does not appear to me comparable with the dark or black-spotted plumage of the first division. Its position in the second or green section is obvious, and *Rhodacanthis* might well be united with it generically.

DREPANIS Temm.

Native name *Mamo*.

The only representative of this genus is the celebrated Mamo whose plumage supplied the material for the choicest of that feather-work for which the Hawaiian Islands have always been famous. The Mamo is now a very rare bird and it is quite possible that any year may be the last of its existence. Formerly it was without doubt of wide range over the island of Hawaii since it is known to have occurred both in the leeward and windward forests as well as in the Kohala Mountains. Unlike the Oo, which after the yellow axillary feathers were plucked out, could be, and sometimes was, liberated practically uninjured, the Mamo entirely denuded of its yellow feathers would have been in a sad plight, and would almost certainly have succumbed to such rough usage. It is quite certain that up to about 20 years ago these birds still existed in some numbers in the forests of Hilo district, for at the time of the great lava-flow of 1880 a considerable number were shot for the sake of the yellow feathers, as many as twelve having been obtained by a native bird-hunter in a single day. None of these were preserved as entire skins, the yellow feathers alone being saved.

That the Mamo is now extremely rare is certain, for Mr W. H. Henshaw, the expert American ornithologist, has not up to the present time obtained a single example, although he has resided only a few miles from a noted and perhaps now the only locality for this bird, whence was obtained the only specimen procured of late years.

Very little is known as to the habits of the Mamo, and the accounts that have been handed down, and the information one can glean from the few existing natives who have seen it, do not always agree. Some speak of it as very tame, others as wild and shy, but the latter account seems generally to refer to localities where, and to a time when, it was systematically hunted. All agree as to its fondness for the nectar of the arborescent lobelias, and it was at the blossoms of these that it was usually captured. Like the allied form on Molokai it seems to have cared little for the Ohia flowers when the lobelias were in bloom. Emerson says that it was also partial to the flowers of the native fan-palms (*Pritchardia*) when in blossom, and I have myself been informed that it habitually frequented these in company with the Ula-ai-hawane (*Ciridops*). A fortunate collector if he could visit at frequent intervals the clumps of these in the heart of the dense forests and far removed from any house (and there are many such groves) might yet obtain both these rarities at one stroke. We are also told by the above-named writer that the bird devoured the ripe red fruit of the Ieie, but I suspect that this may be an error from confusion with the Oo, which is well known to be partial to that food in some localities.

The call of the Mamo is a single, rather long and plaintive note, as imitated by natives who have been familiar with it, and is so generally similar to that of its relative of Molokai, as to leave no doubt as to the correctness of these imitations. It would readily respond to this call, which was regularly used to attract it to the hunter's snare.

As the Mamo was the greatest prize of the ancient bird-catcher, a short account of the different modes of procedure adopted in catching it and other forest birds may be included here. An excellent article[1] by Dr N. B. Emerson on this subject can be found in the Hawaiian Annual for 1895. The first of these methods was by the use of bird-lime, in the employment of which a special apparatus was generally used. This consisted of a long, slender, polished pole (kia-manu), made sometimes of Kauila wood (*Alphitonia*) or of Ulei (*Osteomeles*). At the end of this were fixed three distinct parts, (1) a recurved hook (kihele), by which the apparatus was hung to the tree, (2) a straight cross-bar (kano), and (3) a forked branch continuing the pole (lalua). The manner of dressing the kia-manu varied however in details. Those parts on which the birds would alight were well smeared with bird-lime. This apparatus was used either bare, or it was baited with choice flowers, or with a decoy-bird (maunu), generally the scarlet Iiwi or crimson Apapane, fastened to the prong at the tip of the pole. This bird acted either as an attraction to others of its own species, or to different kinds of birds, especially to the Oo, which would come to attack and drive it from its perch, and itself get caught The habit that several kinds of birds have of alighting on a bare branch, when about to sing, especially on such as project above the foliage of a tree, no doubt allowed numbers to be caught on the bare pole without the use of bait; the more so as natives, who are acquainted with the forest birds, can imitate their call notes in the most perfect manner. The decoy-birds, always honey-suckers, were often kept alive in cages, being easily fed on the nectar of flowers and the juice of sugar-cane, and are said to have become quite tame in confinement. The bird-lime was obtained from several kinds of trees, especially the Papala (*Pisonia*), the Haha or Oha-wai (arborescent lobeliaceae), the Ulu (Breadfruit), and the Koko (*Euphorbia*). The second method was by means of a noose at the end of a fine line made of Olona fibre (*Touchardia*), the snare being so placed that the bird was caught when visiting the bait of flowers, the hunter lying concealed at a distance and pulling the string at the right moment. This appears to have been the chief method employed in catching the Mamo, which was first attracted by an imitation of its call note. In some such way as this, I believe, the specimen obtained in recent years by Mr Rothschild's collectors was caught alive by a native. The third method was the simplest of all. The hunter simply covered himself with branches of bushes bearing tubular flowers, and holding up one of these between the finger and thumb, as soon as a bird inserted its beak into the blossom, grasped this tightly and pulled it down under the leafy covering. This is the method which the naturalist Townsend observed as practised by the native boys on the island of Kauai in 1835. "In this way," he says, "dozens of beautiful birds are taken, and they are brought to us living and uninjured." As the feathers of the native birds were a perquisite of the chief, and not to be worn by the common herd, the former had his own professional bird-catchers, who are said to have been trained in this art from early youth. The Iiwi (*Vestiaria*) and Apapane (*Himatione*) furnished scarlet and crimson feathers, the Ou (*Psittacirostra*) and Amakihi (*Chlorodrepanis*) green, the Mamo (*Drepanis*) yellow, and the Meliphagine Oo (*Acrulocercus*) this colour and black. Of the forest birds no other species appear to have been utilized to any considerable extent, not probably because they would not have been acceptable, but because on account of their habits it would have been impossible to catch them in sufficient numbers by such means as were known to the native bird-hunter. All those that were utilized could readily be caught by a bait of flowers, excepting perhaps the Ou, and this bird probably not less easily on account of its fondness for the ripe Ieie, and its frequent habit of alighting to sing on a bare projecting branch of a tree otherwise well-covered. An excellent account of the feather-work itself is contained in the "Memoirs of the

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[1] The following account is largely taken from this article.

B. P. Bishop Museum" (Vol. I. Pt. I), written by Mr W. T. Brigham, the director of that institution.

(1) *Drepanis pacifica* Gmel.

HAB. Hawaii, formerly widely distributed; of late years very rare and only taken in the Hilo district.

DREPANORHAMPHUS Rothsch.[1]

Native name *Oo-nuku-umu.*

Like the preceding genus this closely allied form is also monotypic, and occupies on Molokai the place of the Mamo on Hawaii. From what we know of the habits of the latter the two forms closely resemble each other in these, as well as in their cries. The Oo-nuku-umu is one of the rarer island birds and is now confined to the higher parts of the forest on Molokai, where the ground is soft and boggy. At the time when I discovered it these woods were in an absolutely natural condition, but since that time both cattle and deer have run through them and they are in most parts much less dense and less wet than they were in 1893. The bird is essentially one of the underbrush, and I never saw it alight high up in a large tree, and only very rarely was it seen at more than twelve feet from the ground. It is a true honey-sucker, and not one of those obtained by me contained animal food. In my earlier notes I supposed it to be insectivorous from the fact that I saw it exploring beneath the wet moss, which covered the tree trunks, with beak and tongue. However a specimen subsequently obtained after it had been watched at this pursuit for some minutes proved on dissection to contain no trace of insect food, and that the adult or the young after they have left the nest are insectivorous is not yet proved. As the moss coating the trees was invariably soaked with water it may be that this only was the object of its search, the more so as insects in this situation were always very scarce. No doubt nestlings will be found to be fed on caterpillars, as is customary with the other honey-sucking Drepanids, but the youngest specimens seen, which were probably about a month from the nest, entirely confined their attention to the nectar of flowers. When investigating the wet moss the tongue is darted in and out with great rapidity so as to appear like a liquid streak, the eye not being able to distinguish each separate movement. On one occasion only was the bird seen to visit the red flowers of the Ohia; the crimson Apapane (*Himatione*), the Akohekohe (*Palmeria*), and the Oo (*Acrulocercus*) being present with it in the same small bushy tree. With that pugnacity which is said to be equally characteristic of the Mamo, it continually drove the smaller red birds from the bush, to be itself in turn driven off by the superior strength of the Oo, but always returning after a few moments to the same flowers. Excepting the above instances, the Oo-nuku-umu entirely confined its attention to the large tubular flowers of certain arborescent lobelias. On one occasion, when engaged in entomological work, I saw three adult males of this bird in one low bush passing from flower to flower and spending only a few seconds over each. These were very tame, and I was able to watch their movements in this and neighbouring bushes for at least an hour. Even those flowers which were at a height of not more than a foot from the ground were carefully explored. The crown of the head of each of these birds was plentifully encrusted, as indeed is usually the case, with the sticky white or purplish-white pollen of the lobelias and gave them a singular appearance. Of all that I ever saw the first two specimens alone were really timid, but at that time I was proceeding carelessly and with much noise, cutting a path as I advanced. More usually they readily approach and even follow the collector, or alight on a branch at a distance of only a yard or two, moving occasionally from place to place and turning the head this way and that to make a thorough scrutiny. For this reason they are sometimes even difficult to shoot, as they keep following the collector as he retires to a suitable distance for a shot, and when they fly off at last it is for good and all. Sometimes when they have satisfied their curiosity they will sit quietly preening their feathers, when they have a very comical appearance, much stretching of the neck being necessary to enable them to reach the fore parts of the body with the tip of their long beaks; at other times they will proceed to feed quietly on the flowers of a neighbouring bush. They readily respond to an imitation of their call note, which much resembles that of the Mamo, but sometimes they utter a loud cry of extraordinary clearness, repeated at short intervals, such as I have never heard imitated by the old natives, who well knew the call of the latter. No doubt this loud cry takes the place of a true song and differs rather in degree than kind from the more gentle call note. The Oo-nuku-umu would appear to be the rarest of all the birds of which I obtained specimens. On one occasion when not prepared to collect birds I saw seven individuals in a single day, but this was quite exceptional, and when wanting a specimen I have spent a whole day or several days in its haunts, and in exclusive search for it, without seeing even a single one, and this at a time when I had become perfectly familiar with its habits.

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[1] The validity of this genus is doubtful. This explains the omission of it from the diagram of pedigree on p. 408. EDITOR.

(1) *Drepanorhamphus funereus* (Newton).

HAB. Molokai, in the higher forest and not common.

VESTIARIA Fleming.

Native name *Iiwi* (*Iwi* and *Iawi*).

The 'Iiwi' is one of the most abundant and generally distributed of all the Drepanid birds, being found throughout the woods of all the forest-clad islands. On Oahu, however, it is now less abundant than on the other islands, but it still exists even in the mountains in the immediate vicinity of Honolulu, although rare. Further away from the city it is common enough in both the mountain ranges. The general scarcity of birds on Oahu as compared with the other islands is noticeable, both as to the number of species and individuals, but this scarcity applies only to recent years, for the well-known ornithologist Townsend expressly states that he found birds more abundant on Oahu than on Kauai, some 65 years ago. On all the other islands the Iiwi was found to be very common from the lower forest up to the highest elevations reached by forest birds, even at those which during the summer months are subject to frequent frosts and at which in the winter the cold is really severe.

The Iiwi is a more powerful flier or at least takes longer continuous flights than most of the Drepanididae, and as its food-supply becomes deficient in one locality it readily migrates to another. In most localities there is however at all seasons a resident population, since all do not depart when these migrations take place. Some parts of the forest, absolutely devoid of native birds at most seasons, are regularly visited by the Iiwi at special times. Thus in some of the valleys of Oahu the mountain apple (*Eugenia*) forms extensive groves, below the ordinary range of forest birds. For a brief period each season numbers of the Iiwi visit the blooms of these trees, and after these fail are seen no more in the neighbourhood until the next flowering season. In the higher forests of the more lofty mountains large numbers are added to the usual stock of residents during the flowering season of the yellow-blossomed Mamani trees (*Sophora*). In the lower forests of middle Kona many thousands of these birds could be seen in a very small area when the great Ohia trees were covered with flowers. On the nectar of these and many others the Iiwi habitually feeds, and is extremely partial to many of the native campanulate or tubular flowers, the arborescent lobelias, the bananas, some labiates, as *Phyllostegia*, the Nukuiiwi (*Strongylodon*), so called from the resemblance of its flowers to the beak of this bird, and many others. Nor does it despise garden flowers which the settlers have brought from other countries, sometimes visiting these even when at some distance from the nearest forest—nasturtium, cannas, lilies, and even roses and peach-blossoms. Nevertheless at the present time, considering the whole range of the bird, its main supply of nectar is furnished by the Ohia, which is not only the most abundant of all forest trees but can also be found in flower either at high, low, or moderate elevation in the mountains at all seasons of the year. However as I have pointed out in the introductory remarks there is little doubt that, had the Ohia existed on the islands throughout the period of the evolution of the avifauna, or at least had it existed in its present abundance, as the chief constituent of the forest, the Iiwi in its present form would not have been developed. This development must have taken place when more or less deep tubular flowers, many of which are quite clearly very ancient components of the forest brush, yielded the main supply of nectar, for obtaining which the beak of the Iiwi is specially adapted, both in length and form. Besides the nectar of flowers, which on some occasions is the only food to be found in the stomach, this bird is especially fond of looper caterpillars, and so far as I have observed feeds its young entirely on these. It also feeds on those species of spiders which are so commonly found on the limbs of forest trees, alive or dead. When hunting amongst the leaves of large Koa and other trees it has a quick, gliding movement, noticeable also in a few of those species most closely allied to it. Its conspicuous black and scarlet plumage is particularly pleasing when seen in the densest and gloomiest forests, so generally devoid of colour and where scarcely any sunlight can penetrate. Here it frequently visits the white campanulate flowers of the underbrush, and as in such situations it is very tame all its movements can be examined with ease at a distance of two or three paces.

The Iiwi when taking its long flights to or from a special feeding-ground mounts to an unusual height in the air, and in these flights several individuals often keep company. The beat of their wings is very audible even when they are high up and at a distance, and is perhaps produced in part by the more truncated apices of their primaries, since it is most noticeable in this and allied species which have the feathers so formed; in fact it is almost confined to these.

The song of the Iiwi is harsh, strained and discordant, the finer the condition of its plumage the more cracked as a rule does its voice become. When the birds are paired and the male is singing to his mate he can often be approached very closely, and no less from the appearance of the bird itself than from the notes does this song appear to be forced out with difficulty. When however large numbers of these birds are found in neighbouring trees mixed with other species, especially the Apapane (*Himatione*), and a regular concert is kept up, the combined effect is not unpleasant. As an alarm or call note the Iiwi gives utterance either to a rather loud unmusical squeak or a clear and distinct whistle. Both call notes and song appear to exhibit some variation in different localities. The yellow black-spotted young follow the parents sometimes till they are far advanced in their red plumage, but they very early learn to obtain nectar for themselves, even at a time when the parents are still feeding them on caterpillars. The changes that take place in the plumage from the young to the adult state are of much interest and are so great that the natives considered some of these stages to be distinct species. This is a curious error and detracts much from our opinion of their powers of observation, seeing that the birds in full plumage are constantly to be seen in company with and feeding their young. Such an error might easily be made by a museum student with insufficient material for study, but it is extraordinary how those who have seen the birds in life could be so deceived. The black markings of the plumage are sometimes very late in disappearing, and in one (the male) of two already paired, shot in the early spring months, black-tipped feathers so far remained as to form a black oblique streak for an inch or more from the shoulders on each side. Some of these black-tipped feathers were still yellow as in the young, others already scarlet, around the occiput yellow black-tipped feathers were still scattered among the red ones. Dissection of these two birds showed that they were already in condition to breed, even if they were not already nesting.

The nest of the Iiwi is larger than that of *Chlorodrepanis*, and not of a very compact or neat appearance. It is usually placed in tall Ohia trees, but occasionally in trees of lesser growth, such as the Mamane (*Sophora*). It is built of dry stems, leaves and rootlets, and the least inartistic specimens that I have seen are formed to a considerable extent of skeletonized capsules of the Poha.

1. *Vestiaria coccinea*, Forster.

HAB. Abundant in the forests of all the islands.

CIRIDOPS Wilson.

Native name *Ula-ai-hawane.*

Formerly widely distributed on the island of Hawaii, to which it was restricted, and known to have inhabited both the Kona and Hilo districts as well as the Kohala mountains, the Ula-ai-hawane is now one of the rarest of native birds and may perhaps be entirely extinct. Very little is known of its habits, but according to Emerson on native testimony, it was "wild and shy, a great fighter, a bird very rarely taken by the hunter." It seems to have been found only in the neighbourhood of the Loulu palms (*Pritchardia*), the blossoms of which as well as the unripe fruit supplied it with food. The palms themselves seem to have been always of sparse or local distribution, and still exist singly or in scattered clumps in the dense forests above Hilo, where I have often observed them, as well as in the Kohala mountains and the Kona district. The only specimen of the Ula-ai-hawane obtained in recent years was an immature bird shot by a native in the neighbourhood of these palms in the Kohala mountains about ten years ago, from whom it was purchased by the Hon. Walter Rothschild's collectors. The reputed pugnacity of this bird is quite in accord with what one might expect, and is characteristic of the section of the family to which it belongs, which seems generally to consist of stronger birds, well able to drive from their food those of similar habits in the other section. If, as we have reason to suppose, the Ula-ai-hawane obtained its chief food supply from these palms, which are themselves by no means abundant and are known to have been visited by other Drepanididae species, this pugnacity may well have been developed to an unusual degree.

(1) *Ciridops anna*, Dole.

HAB. Various districts of Hawaii formerly, now very rare.

PALMERIA Rothschild.

Native name *Akohekohe.*

The single species which constitutes this genus is confined to the neighbouring islands of Molokai and Maui, on each of which it is locally abundant. In its habits it very closely resembles the Apapane, which is often to be found in company with it. Why the range of the larger bird should be now so restricted on the islands on which it is found, as compared with that of *Himatione*, is not manifest, but we know that on both the islands named it had formerly a far wider range than is now the case, and it is possibly more susceptible to those changes that have in recent years taken place in the forests than is the other. Woods opened by the invasion of cattle it sooner or later, as I have myself noticed, deserts, retiring to deep gulches where they cannot penetrate, and from these depths it can be called, while in the surrounding and more open forest not one can be seen or heard.

Its diet of nectar appears to be obtained almost entirely if not solely from the flowers of the Ohia, and the whitish frontal crest is sometimes filled with the entangled pollen grains from these blossoms. It is also partial to caterpillars, and not only obtains those which feed upon the foliage but also searches the dead branches of trees in dense wet woods for those which feed on this substance. When feeding on the Ohia blossoms it is aggressive to other birds, especially to the Apapane, which it drives off, but is itself similarly treated by the Oo (*Acrulocercus*).

Its call note is a simple clear whistle, very easily imitated, and by this means the bird can always be easily called in numbers in a good locality. It is uttered most often naturally on the approach of the mountain fogs, which are so frequent in the favourite localities of these birds, when they call freely to one another across the gulches. The adults, though easily called and curious, are less tame than the young, as is shown by their restless movements when they are attracted, but in dense, untrodden forests they will not infrequently approach the collector from mere curiosity, without any imitation of the call note being necessary. On one occasion I assembled no less than nine adult birds at the same time in one small Ohia tree not more than twenty feet high, and a pair of adults and several young were quite an ordinary gathering. Even when fired at and obviously touched by the shot I have been able to call this bird back into range and secure it at the second attempt.

The young follow the parents often until they have arrived at almost their full plumage, and after they have acquired their full song, but in the winter months these companies are mostly disbanded. In February and March they are generally paired and ready to nest, and are then clothed in their finest plumage. *Palmeria* has the characteristic odour of the family in a varying degree, it being as I have elsewhere noticed much more pronounced in some specimens than in others. Its song is quite distinct from that of any other bird, and when fully rendered consists of a most curious low vibrating sound, then ends with two or three sounds rapidly uttered, and sometimes omitted, which might be expressed as follows: hurr hurr—gluk gluk gluk. There is, however, no difficulty in tracing some resemblance between this song and some of the varying sounds produced by others of its allies, such as the Apapane and Iiwi. Though less lavish of its song than either of the last-named birds, yet it may often be heard, and when about to sing it will often perch on the topmost branch of a dead tree or an isolated dead branch of a living one. Its song like that of the Iiwi appears to be forced out with difficulty and lacks all beauty. It has too other cries, especially a soft note not greatly differing from that of *Drepanis*.

(1) *Palmeria dolii*, Wilson.

HAB. Molokai and East Maui; local, but abundant where it occurs.

HIMATIONE Cabanis.

Native name *Apapane*.

The Apapane is extremely abundant throughout the mountains of all the islands, from the lower edge to the highest parts of continuous forest, but there is often much variation in the number of residents in a special locality according to the season. On Oahu when the Ohia trees of the lowest timbered regions are in flower I have observed this bird in numbers far below the region of continuous forest in scattered clumps of these trees. It is also quite common even now in the scanty forest immediately behind the city of Honolulu. In Cook's time it even visited the coast in so apparently inhospitable a locality as Kealakekua Bay, frequenting the flowers of the coco-nut palms with other forest birds. Changes wrought by the white man have been slow to reduce the numbers of this bird, and some others which like it are, as compared with the majority of the Drepanididae, little specialized in form or habits.

The Apapane is a great nectar eater, and this it procures mainly from the red flowers of the Ohia, while of animal food caterpillars, of which it is particularly fond, are obtained from many trees. It is often very numerous in the large Koas, because these trees are greatly affected by looper caterpillars, but it thrives equally well in forests where are no Koa trees, as throughout the islands of Lanai and Molokai and certain districts of other islands. Taking the same long and high flights as the Iiwi with similarly audible wing-beats, it can, and when necessary does, pass over a wide area in search of the Ohia blossoms, as well as making regular migrations when the flowering season demands. Thus when camped on some of the islands on the highest ridges, which divide the windward and leeward forests, I have often noticed the Apapane as well as one or two other species regularly passing high overhead day after day to that side where the Ohias were in full flower, returning towards evening to the side whence they came. In these cases small companies generally travel together, and vast numbers often collect in a favourite feeding ground, whether attracted by flowers or the abundance of caterpillars. When seeking the latter the Apapane passes quickly over the foliage with a gliding motion.

It is a most untiring songster and its song though short is pleasing, but from constant repetition becomes wearisome. Its call note is a plaintive whistle.

It nests chiefly from March to June but sometimes as early as January, and those nests which I have seen the birds in the act of building (and they have been many) have always been placed in the thin topmost branches of tall Ohia trees and quite inaccessible without special climbing appliances.

As in the Iiwi, the various changes which the plumage undergoes, in passing from the young to the adult stage, are highly interesting.

It may be here mentioned that the outlying island of Laysan has at some time been colonized by the Apapane, which has there developed a distinct form, *Himatione freethi*, not included in this list. The habits of this species appear to be as similar to those of the Apapane as the very different conditions under which it lives will allow. It feeds on insects and the nectar of such flowering shrubs as are found on this low lying island.

(1) *Himatione sanguinea*, Gmel.

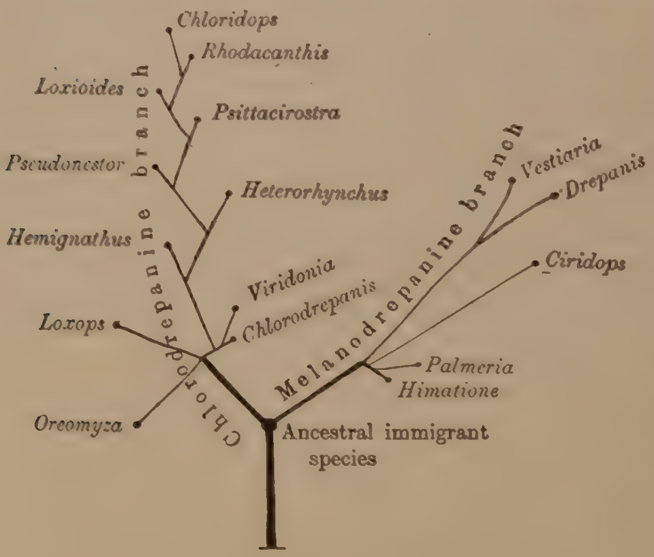
Hab. Abundant throughout the mountain forests of the whole group.

Chlorodrepanis Perkins.

Native name Amakihi; *C. parva* Anianiau.

With *Chlorodrepanis* we pass to the second series of genera, which may be called the Chlorodrepanine as opposed to the Melanodrepanine section, the latter containing all those genera which have been previously dealt with. The characters of these two sections have already been stated in the introductory remarks on the family.

The appended genealogical tree represents the relationship of the various genera to one another in each of the two branches of the family, as they appear to me. The early division into two branches, if it took place within the islands, as I suppose, may really be due to some such simple cause as melanochroism, producing first a distinct species, which subsequently gave rise to a distinct line of its own. It would not be difficult to find arguments in support of this theory, whether we consider the birds alone or other divisions of the fauna. In each of the two groups the more primitive colour of the young often largely disappears in the adult, either of one or of both sexes, probably owing to the operation of sexual selection.



Relationship of genera of DREPANIDIDAE.

There are three well-marked species of the genus *Chlorodrepanis*, two of which inhabit Kauai only, and one intermediate between the two Kauai forms is found on all the other forest-clad islands. This latter has been described under four names, supposed to represent as many distinct species, one being peculiar to each of the four islands inhabited, but the distinctions between them are very insignificant, and the colour of the plumage of the adult males in some of these is known to me to exhibit considerable variation, when large numbers of individuals are examined, even in the same locality and at the same season. Consequently I have not thought it advisable to keep these forms apart in the list until I am assured that they can be invariably distinguished without the aid of a locality label.

With regard to the two extreme forms being found on the single island of Kauai, we may aptly compare this genus with the Turdine *Phaeornis*, which presents an exactly similar case.

All the species of *Chlorodrepanis* are among the most abundant of the existing Drepanididae, and even on Oahu, where so large a proportion of the species are entirely or practically extinct, the Amakihi is quite common, while on the other islands it is extremely numerous and generally distributed throughout the forest. Perhaps the larger of the two Kauai species (*C. stejnegeri*) is on the whole the least abundant, although a sufficiently common bird.

The wide diversity of food accessible to the Amakihi, and the ready manner in which it can adapt itself to conditions much changed by the importation of foreign plants and insects, gives it an enormous advantage over more highly specialized forms. All the species are partial to the nectar of flowers and at certain times this forms a very large part of their food, but their insect diet is also unusually varied. For the latter they seek in all sorts of situations, on the trunks and limbs of trees as well as amongst the foliage, and even ferns and low plants are often visited. The larger Kauai species (*C. stejnegeri*), which is a stronger bird and has a stouter beak than the others, is more constant than these in its attention to the trunks and limbs of large forest trees, and makes the nearest approach in its habits to *Heterorhynchus*, but more or less attention is paid to these by the Amakihi on all the other islands. The little Anianiau (*C. parva*) on the other hand attends more exclusively to the foliage and blossoms for its food. All alike obtain their nectar chiefly from the flowers of the Ohia, not however neglecting many other nectar-producing plants. From the lobeliaceous plants with shorter corollas they can obtain the nectar in the usual manner, while the longer ones they have learnt to pierce at the base, at least in certain localities. Many white campanulate flowers of the underbrush are eagerly visited, as also those of the banana, and in parts of Oahu they are very partial to the nectar of the introduced lantana. In the Iao valley on Maui great numbers were noticed at the flowers of the introduced cannas, which there form some extensive patches. On occasion they are even fruit-eaters, for at times *C. stejnegeri* may be seen day after day feeding on the red berries of the Akia (*Wikstroemia*), and in the higher forests of Hawaii *C. virens* comes even to the ground for the berries of the Poha (*Physalis*). On Oahu the Amakihi took to feeding on a scale-insect (*Lecanium*), with which the leaves of the Kukui trees were some years ago very much infested, and specimens shot in these trees had their stomachs entirely filled with these insects. All the species of *Chlorodrepanis* are of a sociable disposition and often form little companies when feeding, or join those of other birds. Towards the nesting season however the pairs separate, and generally keep to themselves, the one sex following the other as they pass from tree to tree in their feeding grounds. As they get separated from time to time, they keep in touch by uttering their squeaking call note at intervals, and when the distance between them becomes considerable, the one rejoins the other. The song of the Amakihi is a short trill, and when at its fullest loud and penetrating, but not very musical. It may be represented by a 'chee' uttered a number of times in rapid succession. In the smaller Kauai species the song is a little different, the voice being less loud than that of its congeners.

In *Chlorodrepanis* the peculiar odour of the family is very strongly marked, so much so that sometimes even after a company of these birds have left a particular spot, the air remains tainted by the smell. I may here remark that this odour is not perceptible in all the species of the Drepanididae, nor necessarily in all the individuals of a species that possess it, unless perhaps at certain periods of its life, but it is more or less noticeable in the great majority of genera and in both branches of the family. Thus it is particularly powerful in *Drepanorhamphus*, and was strong in some individuals of *Palmeria* in the one section; in the other it is strong and probably always distinct in *Chlorodrepanis*, *Hemignathus*, *Heterorhynchus* and *Psittacirostra*, and I noted it (without special remark) in *Viridonia*, *Pseudonestor*, *Loxioides*, *Rhodacanthis*, *Chloridops* and certain specimens of *Loxops*. Birds of the other genera have it at most indefinitely, or not at all, but they are easily infected by lying in proximity to those in which it is strong.

On one occasion I shot an Amakihi which carried a parasitic[1] Hippoboscid fly, the latter being a very distinct species from either of those which were found infesting the short-eared owl and the Iiwi. Unfortunately the fly itself was struck and mutilated by a pellet of shot which partially imbedded it in the flesh of the bird.

The nest of the Amakihi is a simple structure, and I have noticed it on all the islands in many kinds of trees, sometimes at no great height from the ground, and poorly concealed. It is often built largely of dried roots, leaves, and twigs, and lined with finer rootlets. The least inartistic specimens are formed to a considerable extent of the skeletonized fruit capsules of the Poha, as is the case with those of *Vestiaria*. The newly-hatched young have a wide, short beak very different from that of the adult. It is not till some time after they have flown that this part reaches its full development in this and in many of the other genera of Drepanididae. The eggs of *Chlorodrepanis* are figured in the Proceedings of the Zoological Society for 1897 (Pl. 51 figs. 6, 7) and in the work of Wilson and Evans.

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[1] *Ornithomyia varipes* Walk. Vol. III. pt. II. p. 89 of this work.

There are two points in connection with *C. parva* which may be noticed here. It will be observed that I have changed the native name as given by the various writers on Hawaiian birds, who have either copied from one another, or at least probably obtained the name from the same source. The name adopted by me was obtained from a different source and it has two points of superiority over the other, (1) it has an obvious and distinct meaning, (2) it is admirably adapted to the bird in question, A-nianiau meaning simply straight-beak, the most obvious point of distinction between itself and the Amakihi. It may be noticed that it is composed of exactly the same letters as the name given by other authors.

In their work on Hawaiian birds Wilson and Evans have mentioned the name *Rothschildia* for *C. parva*, but in saying that I intended to establish any such genus they are entirely in error. In the Ibis (January, 1895) I fully discussed the relationship of this bird, pointing out the differences between it and *Oreomyza* and describing the tongues of each, and expressed the opinion that it could not be separated from *Chlorodrepanis* (then included in *Himatione*). I have since repeated this statement, nor have I ever had reason to change my opinion. It would certainly be incorrect to suppose that *C. parva* is in any way a connecting link genealogically between *Oreomyza* and *Chlorodrepanis*, for even the form of its beak (wherein almost solely the resemblance lies) is obviously due simply to the diminution in size of this organ, in correlation with the small size of the bird itself. *Oreomyza* and *Chlorodrepanis* are, whether considered from the point of view of habits or structure, entirely distinct genera, and *C. parva* is in reality in no sense "intermediate" between them, as has been stated, because it superficially resembles the former in one or two trifling characters, while differing in those of a most important nature.

(1) *Cholorodrepanis virens*, Gmelin.
,, ,, var. *chloris* Cab.
,, ,, var. *chloridoides* Wils.
,, ,, var. *kalaana* Wils.
,, ,, var. *wilsoni* Rothsch.

Hab. Hawaii; the varieties on Oahu, Lanai, Molokai and Maui respectively. All the forms are common and generally distributed in the forest of the islands they severally inhabit.

(2) *Chlorodrepanis stejnegeri*, Wilson.

Hab. Kauai; common.

(3) *Chlorodrepanis parva*, Stejneger.

Hab. Kauai; very common.

VIRIDONIA Rothsch.

Native name unknown.

The single species of this genus is one of the most local of the Drepanididae, since it has so far only been found in the forests behind Hilo on Hawaii on either side of the Wailuku river, at an elevation of from 1200—3000 ft. above the sea. Were it not for its distinct song and call note, this bird might easily be passed unnoticed, unless one were specially searching for it, on account of its general similarity to the other very abundant species which it resembles. I find on reference to my notes that I paid three visits to the locality for *Viridonia*, each of them during the winter months, and on each about two weeks were spent in camp deep in the forest. During my first visit I saw but two specimens and obtained only one of these, but became acquainted both with the song and call note. For the whole two weeks it rained continuously throughout each day, which made collecting both disagreeable and difficult, and exactly similar weather was experienced during my second trip. On the latter however, in the course of a long march on one morning I saw as many as twelve of these birds, all single individuals or pairs, there being no young visible at this season. Six of these I shot at and killed and with no prospect of fairer weather I was content to return to Hilo. My third visit was entirely given up to entomological work, and the weather was as delightful as it had been abominable before, not a drop of rain falling during my fortnight's camping. On this occasion I noticed several individuals of *Viridonia* almost every day, most of them in pairs, and in certain spots the same birds, no doubt, were seen many times, but I collected none of these, since all were in fully adult plumage like those already procured.

Nearly all the *Viridonia* seen by me were in the Ohia trees or more often in the dense masses of Ieie clothing the trunks of these trees, whence they were obtaining their food. In the eight examples that I dissected I found the small forest crickets of the genus *Paratrigonidium* to form a large part of this food in each case. Some of these crickets are specially attached to the Ieie and some live beneath the loose bark of large Ohias, while others are only found on certain ferns, which on more than one occasion I noticed *Viridonia* visiting, no doubt in search of these insects. Caterpillars and spiders were also taken from the bird's stomach as well as a common carabid beetle, which lives at the base of the Ieie leaves, where these are closely attached to the stem. For obtaining the latter and the crickets which live in the same situation, the strong beak of *Viridonia* is well adapted. Once only I saw one feeding at the flower of the Ohia, and although I was unable to procure this for examination, I have little doubt that it was feeding on nectar, since its tongue is still unchanged from the form exhibited by that of the most persistent nectar-eaters. As in some species of *Oreomyza*, *Loxops* and *Heterorhynchus* the habit of feeding on nectar probably survives as a rare occurrence, the typical form of the tongue being fully preserved, since it assists in obtaining some of these insects which form a large part of the bird's food, and not because nectar is of much importance as an article of diet.

The song of *Viridonia* is, as might have been expected, very similar to that of its near ally *Chlorodrepanis*; indeed it would be difficult to distinguish between them were it not that the former whistles two or three distinct additional notes after completing the Chlorodrepanid trill. Many times my attention was called to the presence of *Viridonia*, when I was engaged in insect-collecting, by its song, and but for this it would certainly have been passed unnoticed. It has also a soft cry as a call or alarm note, which somewhat resembles that of *Drepanis*, and by imitating this it can sometimes be called even within a few feet of the observer.

The natives of the present day have no name for *Viridonia*, although those to whom I have shown it, have always recognised it as distinct from any other bird. As far as I can judge, it is one which would have been unlikely to have been caught by the means adopted by the old bird-hunters, and even had it been caught its dull plumage would have been of little value, as the easily caught and extremely abundant Amakihi furnished feathers of a similar or superior quality.

(1) *Viridonia sagittirostris* Rothschild.

HAB. Hilo district of Hawaii; a very local species.

OREOMYZA Stejneger.

Native name varying with the species, *Alauwahio* (*Alauwi, Lauwi*), *Kakawahie, Akikeke.*

As the species of this genus exhibit great dissimilarity in the superficial appearance of the adult males, they were distinguished by several different native names. The three most nearly resembling each other, *O. maculata* of Oahu, *O. newtoni* of Maui, and *O. montana* of Lanai are called Alauwahio, or by the shorter name Alauwi or Lauwi, indiscriminately in each case. The Molokai bird, *O. flammea*, is the Kakawahie, *O. bairdi* of Kauai the Akikeke. *O. mana* of Hawaii is not distinguished by natives of the present day from the Amakihi (*Chlorodrepanis*), but it is unlikely that a bird so different in voice and habits had no special name in the days of the old professional bird-hunters. Both the Kauai and Molokai species no doubt received their names from the characteristic cry which distinguishes *Oreomyza* from all other native birds —the reiterated 'chip,' with which they resent the presence of an intruder.

I have found all the species of *Oreomyza* to be abundant in the islands that they severally inhabit, each forest-clad island possessing a species peculiar to itself.

O. mana of Hawaii is a very abundant bird and generally distributed over the large island. Nevertheless it is absent from some localities where it might naturally be expected to occur. Thus in the middle Kona district, though extremely common at an elevation of about 3500 ft. and upwards, it was altogether wanting in the lower forest, its range coinciding exactly with that of *Heterorhynchus* in the same locality. Seeing that the lower forest with its magnificent Koa trees seemed admirably adapted for both species, I at first supposed that the climatic conditions of this region, with its comparatively heavy rainfall, were unsuitable, but subsequently both were found in company in great abundance in the lower forests of the windward side of the island, where the rainfall far exceeds that of the wettest belt in the Kona district. In the dry upper woods of Kona and Kau, as well as the lower rain-soaked forest of Hilo district, *O. mana* is extremely common, yet the climatic conditions are as different as can well be imagined for so small an area of distribution. In a considerable extent of the Puna forest the bird is likewise absent, but here the Koa is also wanting, and for this tree it has a decided predilection in other localities. The two closely allied species *O. newtoni* and *O. montana* inhabiting Maui and Lanai respectively are each abundant on its own island. The former, extremely abundant as it is on Haleakala, is hardly less so in the widely separated mountains of west Maui, and it can be found from the lower to the extreme upper edge of continuous forest. *O. montana* is ubiquitous throughout the Lanai forest from 2000 ft. to the actual highest point of the island. The abnormally coloured Kakawahie with its fine red plumage is common both on leeward and windward Molokai. It is most partial to dense and wet forests, but not rarely small companies stray down the wooded gulches considerably below the line of continuous woodland. The Oahuan *O. maculata* is less numerous than any of these, though a common enough species, and is found on both mountain ranges, but it seems to have entirely disappeared from the mountains in the immediate neighbourhood of Honolulu, where it formerly occurred. *O. bairdi* abounds in Kauai both in the upper and lower forest region.

The call or alarm note of the species which frequent the intermediate islands of the group is actually or practically identical, that of *O. bairdi* and *mana* of Kauai and Hawaii more or less different, but the general resemblance is so great that no one who has once heard the voice of *Oreomyza* can mistake it for that of any other island bird. It is noteworthy that the two last-named species are subgenerically distinct from the others. Two members only of this genus have I ever heard sing, namely the closely allied species of Maui and Lanai, and the latter of these only on few occasions, and this in spite of the fact that I have seen hundreds of the Oahuan bird and thousands of all the others. Apparently they sing only under stress of intense excitement, as for instance when one male has been successful in driving off another from its domain. On such occasions I have seen the victor rise spirally upwards to a height of twenty or thirty feet pouring out its little song while on the wing and then suddenly darting down again to cover in the underbrush. *O. newtoni* is less sparing of its song than is its ally, and in the spring months I heard it not very infrequently in the West Maui mountains, where in the Iao valley the bird came down even into the bushes of the introduced guava. This song is a short trill, distinctly more melodious than that of *Chlorodrepanis*, but in a general way resembling it. In both these species the 'chip chip' of call or alarm remains unchanged, and in all the others this, or a slight modification of it, is the only sound uttered.

In the brush of unfrequented forests the *Oreomyzae* are very tame and readily approach the collector, often several together, and even as many as a dozen, those in the surrounding country being attracted by the cries of the first arrivals. At all seasons of the year it is noticeable that these groups, in the case of such species as show striking sexual dimorphism, rarely contain more than one male in fully adult plumage, the proportion of such males appearing to vary between one to four in other plumage at or near the breeding season, and one to a dozen or even considerably more after this time. I believe that this disparity is caused by a large mortality amongst the younger birds and not to the fact that a lengthy period is necessary for the assumption of the finest plumage. Observations made on certain species would tend to show that this is fully acquired within a period of twelve months and that many of the young perish before acquiring it. However the fact that the birds breed at irregular seasons, so that young just from the nest may be found at almost any time, makes it very difficult to ascertain the true state of affairs in the field. It is quite certain that in some localities two, if not more, broods are produced in the course of the year. No doubt a much larger proportion of fully adult males would often appear in collections, because of a natural tendency on the part of the collector to pick out an undue number of specimens in their brightest plumage, although these adults are generally less tame than the immature individuals. My observations on the numbers of adult males are taken from field notes made in localities where I have been able to examine not usually less than one hundred individuals in the course of a day's collecting. On one occasion of 127 *O. flammea* examined 18 were adult males, or 1 in 7, and I believe this would be a fair average proportion for this and other species, as estimated for all seasons of the year.

In habits all the species of *Oreomyza* are very much alike, a large part, and in some species nearly the whole, of their food being obtained from the trunks and limbs of the forest trees and bushes. All are expert at climbing upon these, working either upwards or downwards, and along the upper or under side of the horizontal branches. *O. mana* is extremely partial to the large Koa trees and the undergrowth of bastard sandal, mamani, etc. of the lesser trees. In the former *O. bairdi, O. maculata* and *O. newtoni* also abound in some localities, but they thrive in forests absolutely destitute of Koa. Thus over extensive areas on Kauai the Ohia is to *O. bairdi* what the Koa is to *O. mana*, and of the lesser trees the underbrush of Kalia (*Elaeocarpus*) is as favourite a resort of the former, as the bastard sandal is of the latter. I have noticed that all the species come down to the base of the trunks and sometimes even on to the ground itself, and some habitually hunt in the masses of creeping ferns, as well as on the fronds and stems of those which form large trunks. The closely allied *O. newtoni* and *montana* alone appear to feed on nectar, visiting as a rare occasion the red flowers of the Ohia, the nectar of which is easily attainable by their short, and for honey-sucking purposes degraded tongues. Excepting these two species the *Oreomyzae* feed entirely on animal food, of which caterpillars and spiders form a large part. Myriapods, slugs, beetles and moths are also eaten; the latter if of large size they hold down with their claws, and tear off the wings before devouring them. Dead wood they search for the many species of caterpillars, which live in this substance, and those species of loopers or span-worms, which habitually hide beneath the bark of trees and in crevices during the daytime, are often found in the stomach, as well as those which feed exposed on the foliage. The Oahuan species has the knack of obtaining one of the most remarkable of the Hawaiian Carabid beetles in quantities, to judge from the remains found in the bird's stomach, yet for the entomologist it is difficult to obtain even a single specimen. I have little doubt that it obtains these from the interior of dead branches of lofty Koa trees, practically inaccessible to the insect collector, since they are generally found in those shot when feeding in this situation.

The beautiful Kakawahie of Molokai appears at first sight to be the most aberrant species of the genus, but is in reality closely allied to the Lanai and Maui species. It may be supposed that the change from yellow to red plumage is a simple matter in the Drepanididae, since in the adult male of *Loxops ochracea* in full nuptial and breeding plumage, the feathers are either red or yellow in different individuals or sometimes intermediate in colour. Even in the present species when in full nuptial plumage the colour is of a distinctly yellower red in some than in others. The young of *O. flammea* is extremely like some of the other species at certain stages, at one period having white super-orbital lines meeting on the forehead in front—markings so strongly developed in the young of *O. bairdi*, and manifest in others of the genus.

I have several times found the nest of *Oreomyza*, never with eggs, but once with a single young one hardly able to fly and still retaining a little of the down. It was placed in an Ohia tree at a height of about 20 ft. and resembled the nest of *Chlorodrepanis*, for which, but for the presence of the young, it might have been mistaken.

(1) *Oreomyza bairdi*, Stejneger.

HAB. Kauai. Common and widely distributed.

(2) *Oreomyza mana*, Wilson.

HAB. Hawaii. Widely distributed and very abundant in many localities.

(3) *Oreomyza* (subg. *Paroreomyza*) *flammea*, Wilson.

Hab. Molokai. Widely distributed and common.

(4) *Oreomyza* (subg. *Paroreomyza*) *montana*, Wilson.

Hab. Lanai; common and generally distributed.

(5) *Oreomyza* (subg. *Paroreomyza*) *newtoni*, Rothschild.

Hab. Maui, both in the East and West divisions of the island; abundant.

(6) *Oreomyza* (subg. *Paroreomyza*) *maculata*, Cabanis.

Hab. Oahu in both the Waianae and Koolau mountain ranges; common.

(7) *Oreomyza perkinsi* Rothschild.

Hab. Kona. Hawaii.

Note. I have not seen this species, and before deciding on its validity it is essential that the generic characters should be critically examined. It seems to me extremely improbable that *Oreomyza mana* and *Chlorodrepanis virens* would ever interbreed, as is suggested. From the description it would appear much more probable that the unique specimen is a 'sport' of the last-named species.

Loxops Cabanis.

Native name of all the species (excepting *L. caeruleirostris*) "Akepa."

The four species of this genus have a very distinctive appearance, owing to their small size and comparatively long tail, which when they are seen alive appears quite conspicuously forked at the tip. This character readily serves to distinguish the green-plumaged young and adult females from other species superficially resembling them, when, as often, they are feeding in the same trees in a mixed assemblage.

All the species excepting the Oahuan *L. rufa* are common locally on the islands that they inhabit, Molokai and Lanai alone being without a species.

L. coccinea of Hawaii is very widely distributed on that island, and in parts of the Kona district, in Kau, Hilo and the Kohala mountains is abundant. It is extremely partial to the Koa forests, but is found in localities where are none of these trees, as in the forest between Kilauea and Keauhou (in Puna) and elsewhere. *L. ochracea* on Maui is also often seen in the Koa trees but more often in the Ohia, which latter are the favourite feeding ground of *L. caeruleirostris* on Kauai.

The various species of *Loxops* are amongst the most active of native birds and their name Akepa, signifying 'sprightly,' 'turning this way and that,' is singularly appropriate. This name is applied by well-informed natives of the present day to both the species inhabiting Maui and Hawaii, and Bloxam gave the same name for the Oahuan form three-quarters of a century ago. For the Kauai species Scott Wilson gives the name Ou holowai, but in various parts of that island I have been assured by natives that the true name is Akekee. If the latter, as I suspect, be correct, it is very appropriately applied, and would indicate that the natives had observed a noticeable generic character of *Loxops*, namely the abnormally bent mandible. It is true that Andrews says the Akekee is 'a small brown bird resembling the wren, found on Waialeale Kauai,' which could only refer to the fly-catcher (and of which Wilson's Apekepeke might perhaps be a corruption); but as he is sometimes clearly in error in the remarks on birds made in his dictionary, and some extremely well-known species are altogether omitted, I am disposed to accept this name as correctly applied to the *Loxops* by living natives, who showed themselves well acquainted with other birds of the same island. It is certainly strange if the 'Elepaio' (*Chasiempis*), a bird so famous in song and legend, was given a distinct name on Kauai alone, for though the Kauai form is specifically quite distinct, in its voice, habits and superficial appearance it agrees with those on the other islands. On the other hand the *Loxops* of Kauai is a bird which, when adult, is of very distinctive appearance and highly characteristic of the avi-fauna of Waialeale.

In their general habits the species of *Loxops* approach most nearly to *Chlorodrepanis*, since they obtain their food chiefly from the foliage of the trees, and not like *Oreomyza* from the stems, branches and trunks. They are largely eaters of caterpillars, feeding not only on the common exposed span-worms or loopers, but seeking also the more hidden smaller kinds, which feed in the leaf-buds, or are otherwise concealed. The abnormal structure of the mandible is clearly connected with the habit of seeking food in the closely imbricated buds of some of the forest trees. *L. coccinea* seeks its food largely amongst the phyllodes of *Acacia koa*, the favourite food plant of many caterpillars, but, when it frequents woods composed almost entirely of the Ohia, it, like its allies, pays most attention to the ends of the branches and the terminal buds. Even in the dry upland forests it by no means confines its attention to the Koa, but often comes low down into the bastard sandals, alii (*Dodonaea*) and other of the lesser trees, not only for feeding purposes, but often during the mid-day heat to enjoy a siesta in the superior shade afforded by these trees. In the forests a few miles from the crater of Kilauea on the Kau side, where the bird is abundant and as many as a dozen, young and old together, may be seen in a single Koa tree, it is pleasant to watch these little birds, still hardly for a moment, as they flit from twig to twig in search of food; and in the heart of the forest on Mauna Kea in Hilo district with its entirely different climate they are perhaps even more numerous. On Kauai *L. caeruleirostris* keeps chiefly to the high plateau where it is both numerous and widely distributed, but in the winter months it may be occasionally seen in the lower forests, no doubt being driven down to these by stormy weather. It is often seen in small companies of six to a dozen individuals, and often accompanied by other birds, especially the species of *Chlorodrepanis* and *Oreomyza*.

The food of all the species of *Loxops* consists very largely of caterpillars and spiders, but as was the case in *Oreomyza*, two of the species of this genus also—*L. caeruleirostris* and *ochracea*—feed more or less rarely on the nectar of the Ohia blossoms. The thin, long, honey-sucking form of tongue is fully preserved in all, in spite of the small attention paid to such food, but with the distorted mandible it is obviously a very efficient help in procuring the larvae which feed in the terminal buds of trees as well as those which live between leaves fastened together, which I have seen them extracting. Some of the species obtain wood-feeding larvae to some extent, but they seek for these less than does *Chlorodrepanis*, and far less than *Oreomyza* or *Hemignathus*. When exploring the bark of the branches of trees, it is generally for those spiders, which live on the surface, that search is made, as I have satisfied myself by dissection of birds obtained whilst feeding in this situation. There is no doubt that *Loxops* is of high value in the forests and destroys quantities of insects, which are well concealed and obtained only to a comparatively small extent, or not at all, by the other native birds. For many of these hidden larvae they compete rather with the native wasps than with other birds.

I have in an early paper on Hawaiian birds noticed the fact that one of the most characteristic peculiarities of structure of the species of *Loxops* is the more or less asymmetrical mandible, which tends more or less to cross the maxilla. This twisting of the lower jaw is either to the right or left according to the individual, and varies also in amount. This peculiarity naturally calls to mind the much greater asymmetry shown by the beak in the crossbills, as it of course did to Cabanis, when he applied the name *Loxops* to the Hawaiian bird. Dr Gadow, in his second paper contributed to Wilson and Evans's work, says that this twisting of the mandible is acquired individually, and is due to the fact that the birds twist open seeds and cracks of bark in search of food and that it is smallest in young birds. The latter statement is no doubt sometimes true, but that it is so is due to the fact that in very young birds the beak is altogether less developed, and the asymmetry, which is never great, is consequently less apparent. Thus too in the long-billed Akialoa (*Hemignathus*) the difference between the length of upper and lower jaw is often much less striking in the young than in the old bird, because in the former the whole beak is less developed. Again, in the amount of this difference in length there is individual variation both in young and old of the Akialoa, and the case may well be compared with that of *Loxops*.

The essential use of the distorted mandible of *Loxops* is without the least doubt for the extraction of insects living hidden in the leaf-buds of certain forest trees. These buds may not inaptly be compared to the pine cones from which *Loxias* procures its food, although their much softer substance by no means requires the more powerful implements of the crossbill. As has been already mentioned the bill of *Loxops* is also useful in opening out the Koa phyllodes, when fastened together by certain caterpillars, or by some spiders (of which it is extremely fond) which thus conceal their nests.

The full song of each of the four species of *Loxops* is a short trill, nearly or quite identical in all. The adult female of *L. coccinea* sings more musically, but still more softly, than the male. Her song is generally uttered from the dense cover of some tree of the underbrush, the notes sometimes being repeated at such short intervals as to form a practically continuous song lasting for some minutes. The call note is a simple 'keewit,' much less loud than the otherwise similar call of some other species, such as *Heterorhynchus*.

Sexual dimorphism is extremely marked in the adults of all the species, excepting *L. caeruleirostris*, the ♂ of which to a large extent preserves the green plumage exhibited only by the female and young of the other species. *L. ochracea* is unique in the two distinct forms of its fully adult males, these being distinctly red or yellow during and previous to the nesting season, when their plumage is finest. There are however individuals more or less intermediate between these two forms. The most deeply coloured examples approach very closely to *L. rufa* of Oahu. The red males of *L. coccinea* and probably of other species pass through a stage (non-breeding) when the plumage is largely of a greyish colour, a similar phase being shown by *Oreomyza flammea*. This phase is also more or less noticeable in many of the green-plumaged birds of other genera, though less striking than in the red species above-mentioned, and is probably pretty general in this section of the family, but I think not exhibited by the other section (*Himatione*, etc.). The fully adult females of *L. coccinea* show very considerable variation in the colour of their plumage even at the same season, that is when nesting or about to nest. In all the species of the genus, excepting *L. coccinea*, the beak is largely of a bluish colour in the adult, but in that species when alive or freshly killed, it is extremely different, being largely of a pale yellowish colour.

On one occasion I saw a pair of the Maui species building their nest high up in a tall Ohia, near the extremity of a horizontal branch. Both sexes kept coming to the ground for material and were carrying off the woolly down or 'pulu' of some stunted tree-ferns, probably as a lining for the nest. This was so well concealed that even with glasses I was unable to make out the details of structure with any certainty, and the eggs and unfledged young I have not seen.

(1) [1]*Loxops coccinea* Gmel.

Hab. Very generally distributed on Hawaii, and in many places abundant.

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[1] If I remember rightly there is a Hemipterous genus *Loxops* (Fieb. 1858) also, curiously enough, with a species *coccineus*.

(2) *Loxops ochracea* Rothsch.

HAB. Haleakala Maui; abundant in some localities. Not noticed in the mountains of West Maui.

(3) *Loxops rufa*, Bloxam.

HAB. Oahu; now very rare, but no doubt attainable, since I recently heard a pair calling to each other far back in the forest, when I was engaged in entomological work. The call note is identical with that of *L. aurea*.

(4) *Loxops caeruleirostris* Wilson.

HAB. Kauai; common over a large part of the high plateau.

HEMIGNATHUS Lichtenstein.

Native name *Akialoa* or *Akihialoa*; but formerly on Oahu and Kauai *Iiwi*.

In their habits the species of this genus are quite intermediate between *Chlorodrepanis* and *Heterorhynchus*, since they are greater nectar-eaters than the members of the latter genus and hunt more persistently, creeper-like, on the limbs of forest trees for wood- and bark-eating insects than does the Amakihi (*Chlorodrepanis*). In general structure they much resemble the latter, differing chiefly in their stronger build, the excessive elongation of the beak, the entire absence of setae at the base of the nasal openings and the relatively extremely short tail. In the latter respect they closely resemble *Heterorhynchus*, but apart from the very different form of beak, they are at once distinguished from that genus, since it has the nasal openings well protected by setae.

Two of the four known species are now excessively rare, namely the *H. lichtensteini* of Oahu and *H. lanaiensis* of Lanai, in fact it is possible that either or both of these may be now extinct. Of the former the only specimen known to exist is that which, collected over half a century ago, is now in the museum at Berlin, and we have no reason to suppose that the bird within historical times was other than a great rarity, or that a second example was ever obtained. However, on one occasion, I saw a pair of this species, the one chasing the other over a narrow ridge high up in the mountains. The leading bird passed over this ridge and down into the deep gulch on the other side, squeaking as it flew, the other alighted in an Ohia tree on the top of the ridge about 10 yards in front of me. The latter when I shot dropped over the steep edge and after much searching I was unable to find it. I distinctly noticed the sombre plumage of the upper parts, which in no way approached the yellower colour of the other species with which I was then familiar.

Almost equally unfortunate was my experience of *H. lanaiensis*, of which I saw but a single example. This was evidently an adult male, its plumage appearing quite brightly yellow, and unlike any of the figures in Mr Rothschild's work. There is no doubt that his figure of the adult bird, if really taken from an adult, represents the bird in its non-breeding stage, for in January, when I saw the one above mentioned, all the adult birds on Lanai were in the fullest and most perfect plumage. It was extremely tame, at times not five yards distant, hunting for insects along the trunk and large limbs of a partly fallen Ohia, which overhung the edge of a precipitous cliff. As, if killed, it would necessarily have fallen in the brush far below, or have lodged in the shrubbery on the side of the cliff, being without a dog I forbore to shoot, and when after some minutes it flew off, it was seen no more. It is probable that this was really a survivor of the brood obtained by Mr Rothschild's collectors, since Wolstenholme, who discovered the bird, informed me that all of their specimens were obtained in the same spot and practically at the same time. Certainly the bird seen by me was quite alone, and this at a time when mature birds were all paired, and it may even be feared that it was the sole living representative of its species. If, however, a few pairs remained it is possible that the Lanai Akialoa may even have increased in numbers, as I am told that the forest of that island has improved rather than deteriorated since I made my last visit.

The other two species of the genus, the one peculiar to Kauai the other to Hawaii, are common enough, though less numerous in individuals than the species of *Chlorodrepanis*, *Oreomyza* and *Loxops*. The Akialoa of Hawaii I found to be more widely distributed, but less numerous than its *Heterorhynchus*; the Kauai species much more widely spread and at the same time much more numerous than its Nukupuu (*Heterorhynchus*). *Hemignathus obscurus* has been found in each district of the large island and frequents both the lower and upper parts of the continuous forest. It was common in Kona in 1892 and 1894, not only in the denser forest but also in the open parts at all elevations, abundant in Kau district in the Koa woods three or four miles from Kilauea, numerous in the heart of the virgin forest of Mauna Kea, north of the Wailuku river, as also in the Kohala mountains. In Olaa it was less common, at least at 1500 to 2000 ft., where I chiefly observed it; and here the magnificent virgin forest has now been cut down for the purpose of planting coffee and sugar-cane. The still finer species, *H. procerus* of Kauai, I noticed generally throughout the forests of that island, wherever I collected birds, from nearly the highest point of the mountains to 1500 ft. and even at lower elevations.

The species of *Hemignathus* differ but little in their habits from one another, certainly not more so than do the individuals of a single species, when they occupy localities where the climate and general conditions are extremely different. The two common species are both partial to the nectar of some kinds of arborescent Lobeliaceae (called Haha and Oha-wai by the natives), especially to those with large corollas, while to certain kinds they pay no attention at all, however profusely they may be in flower. In the heart of the forest on Mauna Kea, during three weeks of continuous rain in the winter months I daily observed the Akialoa visiting these flowers; as also on the rough lava-flows in the Kona district on the other side of the island. When visiting the Haha, the bird is often exceptionally tame, and with a little care all its movements can be watched from a distance of only a few paces, and when it is only a few feet from the ground. *H. procerus* on Kauai likewise obtains nectar from the same remarkable flowers, and is likewise fastidious in the choice of species that it frequents, some of the most abundant Lobeliaceae (even when well-liked by other honey-suckers) being rarely, if ever, visited. At times, even when the Akialoa was feeding on insects, and in places where I noticed no flowering lobelias, I found the forehead to bear more or less evident traces of the pollen of these flowers, showing that they must have lately visited these. Wolstenholme himself informed me that he shot the Lanai Akialoa, while they were seeking the deep-seated nectar of the Haha.

At other times both the common species resort to the flowers of the Ohia with their exposed nectaries. In Kona *H. obscurus* was common in the very tallest flowering trees, frequently two to eight in a single tree, but requiring to be looked for amongst the extraordinary numbers of commoner Drepanids. In some localities and at certain seasons the Kauai bird is an eager visitant to the Ohia flowers. One of the best localities known to me for entomological work was an open dry slope of an acre or two, which lay in the midst of a forest consisting largely of Koa trees, and in and about this spot I spent many successive days in the spring months. In the middle of the open space grew several low and bushy Ohia trees, at that season covered with flowers, although those in the surrounding forest bore few or none. To these isolated trees the Akialoa would come at intervals throughout the day, sometimes a number of individuals being present at one and the same time. Yet in the surrounding forest the birds appeared to be always hunting for insects on the branches of the trees, and were not seen to pay any attention to such flowers as were to be found. In other localities and on other occasions I have made similar observations, and I am quite satisfied that the different kinds of Akialoa are all still largely nectar-eaters, although possibly on the way to become entirely insectivorous. In the following genus, *Heterorhynchus*, we see a still further advance in the latter direction, indeed one of the species (*H. wilsoni*) already feeds on insects and spiders alone.

The insects on which *Hemignathus* feeds are sought for mainly in similar situations to those affected by *Heterorhynchus*, namely in or beneath the bark of trees and in decaying wood; and in fact the very same species are frequently found in the stomach of each of these birds, but those of the first named genus have a more varied diet. In the large Koa trees of open woods in Kona from 2000—3000 ft. above the sea the Akialoa could be traced by its audible tapping on the bark, the sound resembling that produced by the strokes of the beak of the Nukupuu, except that it was less loud. In the excessively wet forests of windward Hawaii it was sometimes seen on the stems of the tree-ferns, or amongst the masses of climbing Ieie (*Freycinetia arborea*), exploring with its long beak in the first case the cavities of the stems of old fronds, broken off close to the caudex, and in the second the bases of the stiff clasping leaves and the débris found there, in both of which situations insects habitually harbour. In most of the higher forests, where the rainfall is less, the Akialoa is mostly attached to the Koa, though it visits the lesser trees, Mamani, Naeo and stunted Olapa, and on Kauai comes even to the ground in the Ohia forests, when, no doubt, it is in search of fragments of lava, such as are sometimes found in its stomach.

The species of *Hemignathus* are fond of spiders, which they chiefly obtain on or beneath lichen-covered bark, and of many insects, which hide beneath the bark of trees, or actually live on this or the wood beneath. Amongst these are Geometrid caterpillars which secrete themselves by day; wood- and bark-eating Gelechiid larvae or such as feed in the rubbish which collects in the forks of trees or at the bases of the leaves of certain plants; beetles in the mature state, such as arboreal species of Carabidae rarely, the small metallic weevils of the genus *Oodemas* (favourite food also of the Nukupuu) very freely in many localities, Anobiidae in some districts; larvae of the latter and of Cossonidae, and others. In addition to these in the Kauai bird were found specimens of the small native cockroach and of certain remarkable crickets (Prognathogryllides), quite peculiar to the islands. For obtaining such insect food the long, slender, curved beak and brush-tongue is as admirably adapted as it is for extracting the hidden nectar in the long curved tubular corolla of the Lobeliaceae. To a small extent the Akialoa feeds on leaf-frequenting insects, occasionally picking off caterpillars, or even making a dart at some more active form.

Several times, both on Kauai and Hawaii, I have killed a specimen when feeding woodpecker- or creeper-like on the surface of a tree-trunk, and it has remained suspended from the tree by its beak alone, this organ at the moment of death having been thrust into some crevice or insect burrow, which it was probing for food. I have seen *Heterorhynchus wilsoni* suspended by the curved maxilla alone in similar fashion.

The song of *Hemignathus* is a short, vigorous trill, recalling that of both *Heterorhynchus* and *Chlorodrepanis*, but distinct from either. It has a louder and deeper call or alarm note than the latter, and this too is easily recognizable. Both the Kauai and Hawaii bird sing quite freely at certain times and places, and it is remarkable that when feeding on the nectar of flowers they are more lavish of this song than at other times. In this connection it may be noticed that of the *Oreomyzae* the two nectar-eating species alone have been heard to sing, the song being as rare as the nectar-eating habit, and it would appear possible that in these genera such a diet is a stimulus to song.

I once saw the nest of *Hemignathus obscurus*. It was built towards the extremity of one of the largest spreading branches of a Koa, placed above a fork and well concealed. It contained only one young one, and that already able to fly, while a second one was seen sitting on the branch outside the nest, with the old birds. The nest itself so far as I could get sight of it appeared to be quite similar in form to that of *Chlorodrepanis*, but was better concealed amongst the lichens covering the branch, and these appeared to have been partly used in its construction. This nest was found at the end of June, and in the same district (Kona) many young birds were noticed at the time being fed by the parents.

Like many other Drepanididae[1] the species of *Hemignathus* are grievously affected by a disease, which is probably contagious, and causes swellings on the legs and feet, as well as on the head at the base of the bill, and on the skin around the eyes. One individual of *H. procerus* affected in all parts I picked up on the ground, it being quite unable to fly. Quite recently (Feb. 1902) two individuals of *Oreomyza flammea* were examined, one of which was crouched on the ground at the foot of a bush, the other in the middle of a dense shrub. Both of these birds were affected on the head, and neither would move until they were actually poked up. In other cases birds, on which these growths are largely developed, appear not to suffer very serious inconvenience. Sickly birds generally retire to dense cover to die, so that it is difficult to estimate whether the disease causes much mortality. I have no doubt it is sometimes fatal. It not only affects the smaller birds but the crow, the buzzard, the introduced pheasant and even the Californian quail are sometimes attacked, and a similar disease is very disastrous to tame poultry. It is quite probable that the disease was introduced with the latter.

The Kauai *Hemignathus* is also subject to the attack of internal parasites of two kinds, the remarkable *Apororhynchus hemignathi* of the Acanthocephala, and the tapeworm *Drepanidotaenia hemignathi*. The former is the sole representative of a (so far) peculiarly Hawaiian family (Apororhynchidae), the latter is congeneric with the tapeworms of other birds. A second species of tapeworm attacks the *Loxops* of Kauai, and I think the *Hemignathus* as well.

Although *Hemignathus* is now widely known under the name Akialoa on the various islands, it formerly, both on Kauai and Oahu, was called Iiwi or Iwi, the red *Vestiaria* being distinguished as Iiwi-polena, Iiwi-popolo, &c., according to the colour of its plumage. Though the Oahuan bird was said by its discoverers to be called 'Jibi' by the natives, this is clearly an error for Iiwi, the *I* being changed into *J*, just as the Iao valley is not infrequently misprinted 'Jao,' while the difference between *w* (sounded as *v*) and *b* is not great.

(1) *Hemignathus obscurus*, Gmelin.

HAB. Hawaii; in all the districts, and not rare in many localities.

(2) *Hemignathus lanaiensis* Rothschild.

HAB. Lanai; but very rare.

(3) *Hemignathus lichtensteini* Wilson.

HAB. Oahu; now very rare, perhaps extinct.

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[1] "Ibis," Jan. 1893, p. 112.

(4) *Hemignathus procerus*, Cabanis.

HAB. Kauai; at various elevations and in many localities, not at all rare.

HETERORHYNCHUS Lafresnaye.

Native name *Akialoa, Akialoa nukupuu* or *Nukupuu.*

Four well-marked species are included in this remarkable genus, one member of which is peculiar to each of the four larger islands, while on Lanai and Molokai it is unrepresented. Of the four known species the Oahuan *H. lucidus* is almost certainly extinct, no individual having been obtained for many years. From such information as I have been able to gather from native or other sources it occurred in some numbers at least until about 1860, and frequented what must now be considered as the lower belt of continuous forest, its range in fact being apparently that of the Koa tree. Over the greater part of Oahu the Koa fails long before the main ridge of the mountains is reached, and an examination of the lower edge of the existing forest shows that a large, and probably much the larger part of the Koa belt has now been destroyed. If the bird was really restricted to this lower forest I should consider its total extinction as almost certain. The specimens obtained by Deppe and Townsend in 1837 were from Nuuanu valley, at no great elevation above the sea and were said to frequent the flowers of the banana. No doubt at that time the valley was densely forested for the greater part of its length, since Bloxam records that in 1825 he visited its head by a narrow path through a dense and shady forest. Lying as it does immediately behind the city of Honolulu this fine valley is now practically denuded of its forest and largely filled with unsightly guava scrub; and the cliffs on either side, which to Bloxam appeared bare in comparison with the valley itself, now alone retain their native vegetation. Of late years some attempt has been made to reforest the head of the valley, but the exotic trees now planted are a poor substitute for the many rare and beautiful native species, which once flourished there; nor is it likely that any reforesting will bring back the birds which the American and Prussian naturalists found so plentifully some sixty-five years ago.

The Kauai species (*H. hanapepe*) is by no means a common bird, and its range is rather restricted. It is found on the high plateau of that island, but only over a limited portion, whence came the original specimens obtained by Wilson. At lower elevations (from 2000—3000 ft.) it can be obtained in the forests forming part of the Hanapepe water-shed, on the west side of the main river. Here it can always be met with in certain favoured spots frequenting the Koa trees.

Even more restricted is the range of *H. affinis*, as at present known to me, on the north-west slope of Haleakala, where it is chiefly found about a mile below the upper edge of the forest at an elevation of 4000—4500 ft. above the sea. Here it is often found in company with *Pseudonestor*, which would, however, appear to stray both above and below the range of *Heterorhynchus*. It is rather more numerous in individuals than the Kauai species, since on some occasions a dozen or more adults have been observed on a single day, while rarely have we seen half that number of *H. hanapepe*, even when well accustomed to their habits and favourite haunts. Of course of either species a greater number may perhaps be noticed in a day's hunting at a time when the young are still following the parents, but on the other hand it is quite possible to search very diligently for a whole day on either island and not get a glimpse of either species.

Far otherwise is it with *H. wilsoni* of Hawaii, which is not only widely distributed over that island, but is abundant in localities differing greatly in their climates. In the middle Kona district this *Heterorhynchus* was numerous in the forests of mixed Koa Mamani and Naeo from 3500 ft. upwards. Below this elevation it was not seen, its range being almost exactly identical with that of the underbrush of the bastard sandal (Naeo), the fine Koa trees below this elevation, and situated well within the wet-belt, having no attraction for the bird. This is the more curious when one considers that it is very much at home in the Koa trees of the Hilo forest with its excessive rain-fall, where I found it commonly from 1500 ft. upwards. A few miles from the volcano in Kau it can be observed to great advantage at close range, as it is particularly fond of the stunted bushy Koa trees, that are occasionally met with in those woods. These it habitually frequents in company with the Akialoa (*Hemignathus*) and several other birds, and numbers can be seen on any favourable day. It is also found in the Mamani woods of the Waimea district.

Of all the native Drepanid birds none are more interesting in their habits than the species of *Heterorhynchus*. The three existing species of the genus very greatly resemble each other in this respect, seeking their food in the same manner and feeding on similar forms of insect life. Their climbing movements are more perfect than those of other birds, and they creep over the tree-trunks either upwards or downwards with equal ease, and hunt both along the upper and under surface of the branches. On the 11th of July, 1892, in the high forest of Kona I first had the opportunity of watching one of these birds in pursuit of food, and as I was able to examine all its actions for a long time and at a very short distance, both with the naked eye and with field-glasses, I have little to add to the account then written, after similar observations on many other individuals. The bird in question was an adult male in fine plumage, and when first seen was about 10 yards off, but showed no fear when I approached it much more closely. It was visiting one after another a number of fallen tree-trunks, large but smooth-barked examples of *Acacia koa*. Along each of these it proceeded from one end to the other, peering now over the right side of the trunk and now over the left, so that in a single journey it searched both sides of the tree without retracing its steps. The upper mandible is thrust into small holes or cracks in the wood, while the point of the lower presses on the surface of the bark, and in this manner the burrows of wood-boring insects are opened out. So too it thrusts its upper beak under loose pieces of bark, resting the lower one on the surface, and breaks off fragments of the bark, under which its food is concealed. The upper mandible, though so slender as to be slightly flexible, is very strong, and this flexibility of the beak aided by the extreme flexibility and strength of the neck no doubt greatly assists the bird in exploring and opening out the burrows. In extracting and capturing its prey it also employs the thin brush-tongue, which can be extended to the length of the upper mandible. At frequent intervals it gives several blows to the trunk, the sound of which can be heard at a considerable distance. These blows are dealt with great vigour and with the beak wide agape, so that the point of both mandibles comes in contact with the surface at the same time. On one occasion I watched one lying on a branch of the mamani and basking for a time in the hot sun. Now and then it would lazily turn its head and peck at the bark without otherwise changing its position. Suddenly it started up and began to feed in earnest, dealing blows on the bark with savage energy. Into these blows it throws its whole weight, swinging backwards from the thighs to renew its stroke. In some cases these blows, if not for the purpose of driving out hidden insects, at least have that result, for several times I saw the bird after a stroke make a sudden dart, sometimes even taking an insect on the wing. Though less powerful than those of some other allied birds, the muscles of the head are unusually developed, as indeed are those of the legs, neck and other parts of the body, and the whole bird is of remarkably compact and sturdy build. Not infrequently it lays hold of a projecting piece of bark or the stump of some small broken branch, and shaking its head from side to side and pulling in all directions, endeavours to tear it out. If unsuccessful in the attempt, it will alternate this treatment with a shower of blows from the points of its gaping bill, till either the stump gives way or the labourer is convinced of the futility of further efforts.

Though greatly attached to the Koa the Nukupuu of Hawaii does not disdain some of the lesser trees, especially the Mamani (*Sophora*) and the Naeo (*Myoporum*). In none of the various localities where it abounds, does the nectar of flowers form any part of its diet. For the Ohia, even where it is the predominant forest tree and attains a great size, it has little or no liking, although in restricted localities it visits the climbing Ieie (*Freycinetia*) with which these are clothed. In this respect it differs from its relatives on Maui and Kauai, which may frequently be seen hunting along the larger limbs of a big Ohia.

In their manner of feeding both the Maui and Kauai species greatly resemble *H. wilsoni*, but they are, though very active, less vigorous in their movements, when hunting their prey. Both hammer on the surface of trunk or branch and produce a tapping sound, audible at a distance, but it is generally much less loud than that of the Hawaii bird. They moreover entirely agree with one another in all their habits. *H. affinis* on rare occasions sucks the nectar of the flowers of the Ohia, and *H. hanapepe* is said, on native authority, by Wilson to eat bananas and oranges, which no doubt means visits the flowers for nectar. So the natives say of many birds that they "eat lehua" i.e. obtain nectar from these flowers. As already mentioned, the Oahu species had a similar partiality for the banana flowers. Of all the species of *Heterorhynchus* the insect and other animal food consists to a large extent of spiders, which live exposed on the surface of branches or amongst the lichens which cover these; of caterpillars of Tineidae which live in dead wood, such as *Thyrcopa*, those that live within cases being swallowed case and all, and of larvae of some wood-boring beetles. Looper caterpillars, of such species as hide by day beneath the bark, are frequently eaten, and even those which live exposed upon the foliage, during their periodical swarming. But considering the various species of *Heterorhynchus*, as examined in all localities and at all seasons, their favourite food would appear to be the small brassy weevils of the genus *Oodemas*, a form not less peculiar than the birds themselves. In many localities these beetles invariably form a considerable portion of the contents of the stomach. As these beetles as well as a large proportion of the larvae eaten by *Heterorhynchus* feed solely on wood absolutely dead, these birds have not by any means so great an economic value in the forest as might be supposed, in fact the large number of spiders that they kill largely discounts their services as eaters of looper caterpillars. Though they habitually frequent trees infested with the native Cerambycid beetles they appear to trouble these rarely or not at all, either as larvae or as adult beetles. For this reason *H. affinis*, feeding side by side, as it sometimes does, with *Pseudonestor*, and constantly frequenting the same trees, enters but little into competition with this species, which is constantly on the hunt for these larvae. Strongly built as is *Heterorhynchus* it probably requires the much stouter beak and huge muscles of the allied genus, to open the burrows and extract the grubs of these beetles with sufficient expedition to make them a profitable food. All the species of *Heterorhynchus* are of a sociable disposition, so that when feeding they often join or are joined by several other kinds of birds. This fact makes it far easier to obtain the rarer species, especially *H. hanapepe*, than would otherwise be the case. It is only necessary to listen for the 'chip' of *Oreomyza*, which is constantly iterated when one passes near a company of this bird, and proceed to carefully examine the mixed assemblage of species. Frequently in these gatherings, it may be in some lesser tree of the underbrush, such as the Kalia (*Elaeocarpus*) or a partially decayed Olapa (*Cheirodendron*), quite as often as in some larger forest tree, it happens that amongst half-a-dozen or more *Oreomyza*, a pair or two of Elepaio and Akialoa, several *Chlorodrepanis*, and possibly several Oo overhead, a pair or even several individuals of the Nukupuu will be quietly feeding. Sometimes nearly all the known forest birds of Kauai may be found in a single assemblage of this kind, the perfect climbing movements and extremely short tail at once betraying the Nukupuu, when its beak is not visible to the collector, and its voice is not heard. As it is scarcely possible to pass within hearing of such a gathering without its presence being revealed by the clamour of *Oreomyza*, augmented by that of the Elepaio and other species, many companies can be daily examined and the Nukupuu secured, if not on the first day, at least with comparative ease and certainty.

All the species of *Heterorhynchus* occasionally come down to the ground in quest of fragments of lava, which are no doubt swallowed for the purpose of grinding up the extremely hard brassy weevils, already mentioned as being a favourite food. Although I have frequently observed this habit in all the *Heterorhynchi* from dissections of the body, yet only twice, once on Hawaii and once on Kauai, have I seen the bird on the ground in the act of swallowing these pieces of lava. In each case the bird was standing on one of the narrow paths made by the cattle through the underbrush and trodden bare by these.

The song of the three species is very similar and is a short, loud trill. It is loudest in the Hawaii bird, but otherwise like that of the others, That of the Maui species varies somewhat, and it would appear to make some attempt to imitate the introduced *Carpodacus*, which abounds in the same forest. All are, at most seasons of the year, fairly lavish of this song, and frequently interrupt their search for food to give it utterance. The call note is a loud "kee-wit," very clear and distinct, when the birds are in solitary pairs, and by it the sexes keep in touch when feeding in different trees. This call note degenerates at times into a loud monosyllabic squeak, especially when the bird is alarmed.

Neither the nest nor egg of any species has been observed, unless an example of the former, mentioned under the following species, really belonged to *H. affinis*.

It should be noted that *Heterorhynchus wilsoni* of Hawaii is structurally distinct from the other three species generically, if all the many other proposed genera of Drepanididae be retained. Thus the differences between such genera as *Vestiaria*, *Drepanis*, and *Drepanorhamphus* are very small, as also are those between *Loxioides*, *Telespiza*, and *Rhodacanthis*; and all these might well be included in two genera.

(1) *Heterorhynchus hanapepe*, Wilson.

HAB. Kauai; local and not common on the high plateau, and about some of the side gulches of the Hanapepe watershed (2000—3000 ft.).

(2) *Heterorhynchus lucidus*, Licht.

HAB. Oahu; formerly, now probably extinct.

(3) *Heterorhynchus affinis* Rothsch.

HAB. Maui; on the north-west slopes of Haleakala at 4000—4500 ft. Not rare.

(4) *Heterorhynchus wilsoni* Rothsch.

HAB. Hawaii; widely distributed and common in many localities.

PSEUDONESTOR Rothschild.

The single species of this genus is another most extraordinary development of the Drepanid type. It is more closely allied to *Heterorhynchus* than to any other existing genus of the family, its short tail and robust form, as well as its general habits and its song, all reminding one of the Nukupuu. It differs from that genus chiefly in the enormous development of the beak, which is of great size and compressed form, affording a large surface for the attachment of the great muscles of the jaw, which are necessary for performing its work; and further, in the loss of the typical tubular character of the tongue.

It also calls to mind the Ou (*Psittacirostra*) and is without doubt intermediate in some respects between the two genera. It must not however be supposed that the passage from the thin-billed Drepanididae to the thick-billed, as exemplified by *Psittacirostra*, actually took place through *Pseudonestor* as now constituted, but rather through some lost form, in which the characters of the existing *Pseudonestor* were less extremely developed.

But for the small size of the female the sexes of *Pseudonestor* differ very little, and what must be considered a [1]primitive style of coloration is retained through life. This similarity between the sexes is of very rare occurrence in the green section of the Drepanididae, but is again conspicuous in *Chloridops*, a bird likewise of sluggish habits, and most of whose time is likewise occupied in obtaining food.

So far as is known *Pseudonestor* is restricted to a small portion of the forest on the north-west slope of Haleakala, at an elevation of 4000—5000 ft. It is frequently seen in company with *Heterorhynchus affinis*, and I have killed both birds at a single shot. It is extremely partial to the Koa tree, and at most seasons obtains its food almost entirely from these. This food consists for a great part of the larvae, pupae and immature beetles of the native Cerambycidae, but more especially of *Clytarlus pennatus* and *modestus*, enormous quantities of which it destroys. It also visits other trees occasionally, especially some kinds of *Pelea*, whence it obtains the larvae of *Plagithmysus*, leaving remarkable scars on the tree as a token of its visit. It feeds its young partly on these and partly on looper caterpillars, but they very soon learn to extract the beetle larvae for themselves.

Pseudonestor is generally a sluggish bird, with little of the activity of the Nukupuu (*Heterorhynchus*), although in its movements it in many respects closely resembles the latter. Thus in hunting along a fallen tree-trunk it examines both sides in a single journey from end to end; in opening out the burrows of the *Clytarli* it often wrenches and pulls in a very similar manner; it frequently clings to the under-side of a branch and by stretching its neck raises its head above it, before laying hold of the upper surface with its beak. It is in this position that it bears most resemblance to a diminutive parrot, but the size and shape of the beak greatly increase the resemblance. The twigs and smaller branches of the Koa, in which the *Clytarli* are found, are never rotten, but generally even drier and harder than the healthy, growing wood, and require enormous strength to open them. To perform this, the branch is gripped by the curved upper mandible and the lower one opposed to it, and the burrow of the larva is exposed, either by the act of closing the beak or by wrenching with it, the somewhat slender tongue assisting in extracting the prey.

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[1] Many other Drepanididae in acquiring the adult plumage pass through a stage in which the markings are similar to those of the adult *Pseudonestor*.

Pseudonestor in its native haunts and away from houses is a very tame bird, so that it can readily be watched, exhibiting little or no fear of the observer. On one occasion, when camped beneath some tall Koa trees at about 4000 ft. above the sea, I constantly observed these birds in the tree to which my tent was attached. They are unwearying in supplying their full-fledged young with food, and when the latter are soliciting this from their parents they form a most comical group.

The call note of the adult bird is a loud 'kee-wit,' which cannot always be distinguished from that of *Heterorhynchus.* The song is quite similar to that of the latter, a short, vigorous trill, at its best fully as loud as that of the Nukupuu of Hawaii. It also has a squeaking cry as an alarm note. Occasionally it sings on the wing as it passes from one tree to another, but more often the song is heard from some Koa tree, for the bird, like the Nukupuu, interrupts its labours at intervals to give it utterance. In my original notes on the species I compared the song to that of the green *Himatione* (i.e. *Chlorodrepanis*). At that time I had seen and heard but few of these birds and these were out of condition. Since 1894 I have seen and heard them scores of times, and the similarity of the song to that of *Heterorhynchus* is certain.

On one occasion I found a nest in a Koa tree which could only have belonged to this species or to *Heterorhynchus affinis.* It was built in the fork formed by a branch and the main trunk about 25 ft. from the ground. The tree was covered with grey lichens and the nest was well concealed, being itself covered with the same. It was of simple cup-like form, resembling in this respect the usual Drepanid nest. For several days two old and two young birds, just able to fly, were constantly seen in this tree, and I feel sure that they must have been the former occupants of the evidently newly deserted nest.

(1) *Pseudonestor xanthophrys* Rothsch.

Hab. Maui, Haleakala, 4000 to 5000 ft. in company with *Heterorhynchus affinis.*

Psittacirostra Temminck.

Native name *Ou.*

Alone of the thick-billed, finch-like Drepanids, the Ou is of general distribution over the islands, and excepting on Oahu, where it is nearly or quite extinct, is in many localities a most abundant bird. In March, 1893, I saw a pair of these birds on this island far back in the mountains at an elevation of about 3000 ft. They were probably nesting and were exceptionally tame, the male bird in full song and plumage; and at one time, sitting side by side as they were, I could, had I been willing, have brought down the pair with a single shot. Since that year, although I have spent much time in the forests of Oahu, I have never seen or even heard another individual, though the song of the Ou and its call note are audible at a considerable distance, and cannot be mistaken for those of any other bird. Why the Ou should have become extinct on Oahu and remain abundant in far more restricted forests on Molokai and Lanai is by no means clear, but with regard to the former island it may be noted that now over extensive areas it is often difficult to find a single red Ieie fruit, which the foreign rats have not more or less eaten and befouled, and they may thus have indirectly brought about the extinction of the Ou, even if in times of scarcity of the fruit they do not actually prey on the bird itself. That the Ou is easily caught is proved by the number of times that, when on Lanai, I found the remains of those that had been killed by cats, and twice I shot these vermin while in the act of devouring this very bird.

As the essential food of the Ou is the inflorescence of the Ieie (*Freycinetia*) and its bill, as I have remarked in my earlier publications, is entirely formed and adapted for the purpose of picking out the component parts of this, when fruiting, so its chief home on all the islands lies in the belt which produces this plant. Not that it is absolutely confined to this belt for it is found both above and below it, but in some cases certainly, and perhaps in all, these wanderers return at times to feed on their favourite food. That the latter is the case is the more probable, from the fact that, as I have pointed out in the introductory remarks on the family, the Ou is with the Iiwi and Apapane remarkable for the power and extent of its flights, when seeking food. At all seasons I have found the Ou in the forests of East Maui above the range of the Ieie, as also on parts of the high plateau of Kauai, and elsewhere, but in all these cases no very extended flight was necessary to take it within the range.

In middle Kona, in 1892, where the bird was in countless numbers throughout the wet-belt, many of these strayed up into the dry and higher forest at the end of the fruiting season of the Ieie, and occupied the haunts of their ally the Palila (*Loxioides*), and fed almost entirely on caterpillars. So too, large numbers habitually strayed downwards below the range of *Freycinetia*, especially frequenting the clumps of Kukui trees, but many of these returned in the evening from these isolated clumps to the shelter of the continuous forest at a higher elevation. In Cook's time we are told that they even frequented the inhospitable coast in this vicinity. On another occasion large numbers of Ou wandered upwards above the wet-belt to feed on the swarms of looper caterpillars that were defoliating the Koa, frequenting these trees in company with *Rhodacanthis*. A similar incursion for the same purpose was noticed in the Koa forests above Kilauea in Kau both in 1895 and 1896 in the summer months; and I have no doubt the true home of these wanderers was in the woods of Olaa. These were accompanied by large numbers of the Amaui (*Phaeornis*), and on the latter occasion the period of their stay was brief, lasting only for a space of about two weeks, when both species disappeared together.

Although the large female inflorescence of the *Freycinetia* is the chief food of the Ou, yet it also sometimes feeds on the male flowers, as well as on parts of the pretty red leaf-bracts which surround these. It also in a lesser degree eats the fruits of several other trees, and in forests above the range of the Ieie is very partial to the berries of some of the arborescent Lobeliaceae, and more especially to the large yellow ones of some species of *Clermontia*. In scattering the seeds of these, which like those of some other trees pass undigested through the alimentary canal, the Ou like the thrush is of great benefit to the forest, the more so on account of its wide-ranging habits. The fruit of the introduced guava, which has run wild and spread so widely over the lower parts of the mountains, is greatly appreciated by this bird, nor does it disdain other foreign fruits, which the white man has brought with him. Sometimes the stomach is entirely filled with green vegetable matter, apparently young leaves in a finely divided state. In some localities the bird pays great attention to the red flowers of the Ohia, and I have repeatedly noticed, both on Lanai and Kauai, that it visits these one after another on the tops of the tallest trees, thrusting its head amongst the numerous stamens. Specimens shot while so engaged contained only much finely-divided green vegetable matter, so far as could be distinguished, but I suspect that the exposed nectar of the flowers was really the attraction, although it could not be detected amongst the green stuff with which the stomach was quite filled. Like several other birds of the family, the Ou may not yet have entirely lost the nectar-eating habit, the structure of its tongue being such that it might easily obtain nectar from the Ohia flowers, as *Oreomyza* does on rare occasions. Certainly the birds that were shot while visiting the flowers contained no insect food whatever. The Ou feeds its young very largely with caterpillars, especially those of Geometridae, and at times, when frequenting the forests of lofty Koa trees, itself partakes of hardly any other food. It generally seeks these in the bushy tops of the very tallest trees and is not always by any means easy to get sight of, even when it is in reality quite numerous. When crammed with this food decomposition sets in very soon after death, more quickly in fact than when it is on vegetarian diet, and the skin over the posterior ventral half of the body should be opened and pushed back soon after death, or most of the feathers of the belly will slough off.

In many parts of the islands the Ou is a very tame bird, so that most of its actions can readily be observed at very close quarters. In some woods however which have been much opened and traversed by cattle it has become both scarce and decidedly wary.

It has a rather sweet song, which at times reminds one somewhat of a canary, but is much inferior to a first-class songster of that species. Three or four very distinct and penetrating whistled notes form the beginning of its full song, and are highly characteristic. It sings very freely in the early morning hours, especially just before the nesting season, and when singing delights to perch on the loftiest dead branch that it can find. Sometimes it sings as it flies, and when a small company are on the wing together they not infrequently sing in concert, as they sometimes do at other times, and in a very pleasing manner. The call of the Ou is a rather long note, so whistled as generally to appear of an enquiring nature. To this it will readily respond again and again, and may by this means be brought close to the observer. In foggy weather especially, the birds are continually uttering this call, and often from this single note they break into their full song.

In the middle forest of Kona in June, I observed great numbers of the young, some scarcely able to fly, but neither eggs nor nest. These young were frequenting the dense masses of Ieie, with which the great Ohia trees growing on the roughest lava-flows were covered, and no doubt the nests are built either in the tangled climbers or the trees themselves. In some parts of the islands no doubt the nests might be found without much trouble by anyone who devoted special attention to the matter, but certainly not in localities like the one above mentioned.

Mr Rothschild has separated some old Oahuan specimens as a distinct species under the name of *P. olivacea*, but the characters given for its separation are very slight, and without the examination of many individuals their specific value is very doubtful.

(1) *Psittacirostra psittacea*, Gmel.

HAB. All the forest-clad islands. Extinct or nearly so on Oahu, but common on the rest of the group.

LOXIOIDES Oustalet.

Native name *Palila*.

The Palila is entirely restricted to the upper parts of the forest on the island of Hawaii, where it was found abundantly in the Kona and Hamakua districts, but I have some reason to believe that it has become less common of late years. In 1892 it was extremely numerous in the Mamani belt of the middle and North Kona district, from rather below 4000 ft. to at least 6000 ft. above the sea. In this region it nested in the Mamani trees, and here I saw many young in all stages from those scarcely able to fly to nearly mature examples, but was not able to find any nest containing eggs. Some years later I revisited this spot in the winter and early spring months, when I found the adult bird in splendid plumage, but no immature examples. A few miles from the volcano of Kilauea the Mamani grows quite freely, and I was surprised to find none of the bird in that locality, since it much resembles its haunts in the Kona district.

The food of the Palila is to a very large extent derived from the Mamani trees, on the seeds of which it chiefly feeds. I have frequently seen it cut off a pod and hold it down on a branch with its claws in order to extract the seeds, as Wilson has already described. It feeds its young on caterpillars, and is itself at some seasons most partial to such food, a considerable variety of these being found in its stomach. Amongst these caterpillars is that of a conspicuous yellow, green, and black species of Pyralid, which it finds on the Mamani, and which is sometimes eaten so freely as to exclude all other food. It may be noted that this caterpillar possesses the so-called 'warning colours' in the highest degree, and theoretically should be inedible, yet it is actually chosen in a locality which abounds in the protectively coloured Geometrid caterpillars.

The Palila has a distinctly whistled call note which is easily imitated, and to an imitation of which it will readily respond. When answering, the call note often sounds of an enquiring or inquisitive nature, just as is the case with that of the Ou. It has too a distinct song, which is pleasing, but less so than that of the latter. Like the Ou it is of a sociable disposition, and frequently four or five or more adults in the perfection of plumage were seen in company during the winter months, while birds in immature plumage are nearly always accompanied by their parents long after leaving the nest.

Numerous in its special haunts, tame, and in foggy weather constantly uttering its call note, the Palila of the more local birds is one of the easiest to observe or collect.

(1) *Loxioides bailleui* Oust.

HAB. Hawaii, in Kona and Hamakua; locally abundant.

RHODACANTHIS Rothschild.

There are two described species of this genus, both of which are retained as distinct in the present work, although I am still somewhat doubtful as to the validity of the smaller. Mr Rothschild has no doubt whatever as to their distinctness, and Mr A. H. Evans, who examined the smaller, is I believe of the same opinion. On the other hand Mr G. C. Munro, who either shot the few specimens in question, or was present when they were shot, informed me that neither he himself nor Palmer had any suspicion that there was a second species, though he specially noted the difference in size and colour at the time. Certainly these smaller specimens were obtained at the same time and in exactly the same spot as the larger. Mr Munro further suggested to me that, as he had shot an occasional specimen of *Rhodacanthis* in the Aalii trees, possibly these yellow-headed birds might have been obtained in this way.

On a subsequent visit to the locality I paid special attention to this point, but the occasional examples of *Rhodacanthis* which strayed down to the Aalii, as likewise those in other of the lesser trees, such as the Mamani or Naeo, were all of the typical and larger form. The occurrence of two species so closely allied, if they be distinct, and with presumably similar habits, inhabiting the same restricted area, is highly remarkable. It should not be forgotten in this connection that the fully adult males of the Maui *Loxops* are dimorphic, being either yellow or red, with rarer intermediates. There is no reason to suppose that these yellow birds ever become red with age but rather otherwise, when one examines the colour changes in the plumage of the closely allied *Loxops* of Hawaii, and those of the red Molokai species of the allied genus *Oreomyza* (*O. flammea*). It is therefore not impossible that the case of the two *Rhodacanthis* is in some respects analogous to that of the Maui *Loxops*. I have myself observed distinct variation in the tint of the green plumage of the adult ♂ of the larger species, and some in the depth of the feathers of the head, which are distinctly yellower in some; but even putting aside the question of measurements, I should not consider any of these as true intermediates between the smaller and the larger. Unfortunately it will be very difficult to gain much information as to the smaller species, unless some new locality be discovered. Munro informed me that he and Palmer saw in all a score or two of *Rhodacanthis*, amongst which were two or three of the yellow-headed species. In 1892 in a longer stay in exactly the same locality, I saw several score of the larger bird, and in two subsequent visits, the latter of which was made for the special purpose of investigating this matter, certainly some hundreds were examined with the naked eye or glasses, as the case required. On none of these occasions did I see a single one of the yellow-headed bird, nor did I hear any song or call note that could be referred to a species unknown to me. It is possible, and in my opinion even probable, that the yellow-headed specimens secured by Mr Rothschild's collectors were strays from some unknown locality, and only by chance occupied the range of the red-headed bird. The latter is the largest and most beautiful of the heavy-billed Drepanids. Unfortunately the golden sheen of the orange-reddish crown partially loses its lustre after skinning, and never again does the brightness of the freshly-killed bird return. In the winter months this plumage is at its best, and at this season the bird in life must be counted one of the most beautiful of Hawaiian species. Although spending most of its time in the tops of the loftiest Koa trees, *Rhodacanthis* occasionally visits the lesser trees, especially those already mentioned, chiefly for the sake of the caterpillars that feed upon them. Like the Palila, it sometimes devours large quantities of gaudily coloured species, as well as the more sombre brown or green looper caterpillars. Its chief food is however the green pod of the Koa tree, which it swallows in large-sized pieces, and its blue beak is often stained with the green juice and fragments of the pods. The development of the abdominal part of the body is large, possibly in accordance with the coarse fragments that it swallows, and in this it differs markedly from *Chloridops*, which feeds on the delicate embryos of the bastard sandal, and has the abdominal parts much less developed.

The song, if such it can be called, for apparently it serves also as a mere call, is entirely different from that of any other native bird. It consists of four, five, or even six whistled notes, of which the latter ones are much prolonged. It frequently differs somewhat as whistled by different individuals, and also is sometimes distinctly varied, when repeated by the same bird. Although the notes are not loud, they are very clear, and are very easily imitated, and the bird responds most freely to an imitation. Were it not for this fact *Rhodacanthis*, when keeping to the leafy crowns of tall Koa trees, as it often does, would be most difficult to get sight of. Not only is the male attracted by this means, but the female likewise comes, perhaps not less often than the male, but even when called into the tree, beneath which the observer stands, it is often difficult to locate her. In misty weather they are particularly ready to answer, and I have called as many as seven adult males and two females into one large tree at the same time.

The green-plumaged young, which greatly resemble the female, are fed partly on large fragments of Koa pods, such as their parents eat, both sexes being assiduous in feeding them. At this time the adult female can easily be obtained, but the plumage of neither adult bird is now comparable with its condition in the winter months.

When thoroughly scared the female sometimes gives utterance to a deep single note, which is repeated at frequent intervals with varying intensity, so as to have a ventriloquial effect, and make it extremely difficult to locate the bird. The young male soon acquires the full song of the adult, sometimes even before the crown of the head begins to assume the plumage of maturity and while the skull is still of soft consistency.

I have seen the male bird come down to the ground for building material and carry this to the top of one of the tallest Koa trees, and in this situation, in the locality frequented by the bird, certain largish nests which became visible later, when the trees were stripped by caterpillars, I have no doubt were built by *Rhodacanthis*.

(1) *Rhodacanthis palmeri* Rothsch.

HAB. Hawaii, in Kona district (4000—5000 ft.), and in Kau in the Koa woods some miles above Kilauea.

(2) *Rhodacanthis flaviceps* Rothsch.

HAB. Hawaii, Kona, mixed with the preceding species but much rarer and only obtained by Mr Rothschild's collectors.

CHLORIDOPS Wilson.

In this monotypic genus the gross development of the skull and beak surpasses that of any other Drepanid, and is carried to such an extent that in skinning the bird it is impossible to withdraw the skull through the skin of the neck.

Chloridops is found in the same localities in the Kona district as *Rhodacanthis*, but so far as known to me its range is more restricted, all the specimens seen being noted within an area of about four square miles, and even within this area the bird appeared local. There is no apparent reason why new localities should not be found for it, but it certainly is absent from extensive areas which appear to be admirably adapted to it. Within the area that it inhabits it cannot be considered other than a rare bird, and on the most favourable and exceptional days I have never seen more than 6 or 8 specimens, as paired or solitary individuals. It may be exclusively and diligently sought for a whole day, or for several successive days, without a single example being seen or heard, even when one is acquainted with its favourite haunts and habits. No doubt, when leading about its young, and when, as with so many Drepanids, apparently several broods unite together, a greater number might be met with, and in fact Munro on one occasion, as he informed me, met with such a group, containing not less than 8 or 9 individuals. However such assemblages must be rare, as I never was fortunate enough to meet with one, although I have seen the bird at various times during eight months of the year, and both in the hot and cold seasons. Several times I met with two and even three pairs in close proximity, but these appeared to be really quite independent of one another and merely to have gathered in some particularly favoured spot for feeding purposes.

Usually it is a dull, sluggish and solitary bird and spends nearly its whole time in feeding, mostly in silence,—unlike others of its allies, which at intervals interrupt their search for food to utter cheery song or call note. For the greater part of the year its food consists almost entirely of the embryos of the Naeo or bastard sandal (*Myoporum*), although I have known it to occasionally take a caterpillar. As the dried fruit of the Naeo is excessively hard, it is probable that nothing short of the extremely powerful jaws of *Chloridops* and their great muscles would be able to crack these. In cracking them a sound is produced, which is audible at some distance, and as it is incessant when the bird is feeding, by far the most easy way to get sight of this, is to listen attentively for the sound. The flycatcher when taking an insect on the wing frequently produces a somewhat similar snap with its beak, but the two sounds can always be distinguished. The somewhat sombre green plumage of *Chloridops* conceals it well amongst the foliage, so that, but for the snapping sound that it produces, it would probably be the most difficult to collect of all the forest birds, that are not on the very verge of extinction. It very rarely visits any other tree than the Naeo, but I have once seen it in the true sandal, the fruit of which it also possibly eats.

Only when the sexes are in pursuit of one another have I seen it exhibit any considerable activity, and on one such occasion I heard it utter a squeaking cry. A native whom I took to Kona with me on my first visit, however, told me that he once heard its true song, which was unlike that of *Rhodacanthis*.

Chloridops has a predilection for such Naeo trees as grow on the roughest lava-flows, but it also visits those which grow in and about the more open spaces in the forest. It is a tame bird, and of all that I saw, I doubt whether there was one which I could not have killed, had I wished to do so.

Neither *Chloridops* nor *Rhodacanthis* appears to have any native name. Various names have at times been given me for both of these birds, but of the accuracy of any of these there is the greatest doubt. Natives with a really extensive knowledge of the avifauna, to whom the skins were shown, declined to give them a name, and even suggested that they were 'malahini' (foreign). As a matter of fact *Chloridops* would have been likely to attract the attention of the birdcatcher in a very small degree, and *Rhodacanthis* from the very nature of its habits still less. It is doubtful whether the latter could have been obtained by any means employed by the native hunter, and certainly without the aid of field-glasses he would rarely have had a chance to study its appearance.

The birds of both these genera have the rank Drepanid odour in a marked degree, as indeed have the other heavy-billed forms.

(1) *Chloridops kona* Wilson.

HAB. Hawaii, Kona district, about 4000 ft. Very local, not having been noticed at a short distance to the north or south of its known habitat, in similar forest.

Fam. MELIPHAGIDAE.

ACRULOCERCUS Cabanis.

I have reverted in this work to the already well-known generic name *Acrulocercus* for the birds so extremely well known by the Hawaiian name of 'Oo,' dropping the utterly inappropriate name *Moho* given by Lesson. *Moho* is, as is well-known to inhabitants of the islands, who have even a slight knowledge of the avifauna, the native name of the small flightless rail (*Pennula*), and I have already found that its adoption as a generic term for the Meliphagine genus leads to misunderstandings and confusion.

There are four known species of *Acrulocercus*, one of which, *A. apicalis* of Oahu, is almost certainly extinct; and two of the others (*A. nobilis* and *bishopi*), though far from sharing its unhappy fate, have yet decreased very much in numbers within comparatively recent times, and no longer occupy extensive tracts of country, where once they were very plentiful. Neither of these species thrives in forests opened by cattle, and as a rule they sooner or later entirely desert these, so that the area of forest land suitable for them has for years been diminishing.

The smaller bird of Kauai (*A. braccatus*), although it does not assemble in great numbers in a limited area as the Hawaii bird sometimes does, is both numerous in many places and widely distributed over that island. In its habits it differs very considerably from its allies, and a consideration of these habits may conveniently be postponed until the latter have been dealt with.

The Oo of Hawaii is the most timid and wary of all the forest birds, nor is this to be wondered at, when we consider that it has been persistently hunted for its few yellow feathers by many generations of men. On this account it is now, at most times and places, only to be seen in the tops of the largest and most lofty trees, but that originally this was by no means its invariable, if indeed its usual habit, is certain from observations made on the bird in places where it has probably been rarely or never persecuted. In such places the bird will come freely down into the low brush, where it may be seen visiting the flowers of arborescent Lobeliaceae for the sake of their nectar or those of some of the lesser forest trees, such as the yellow flowers of the Mamani. Nectar is unquestionably the chief food of this Oo, as also of its relative on Molokai, although each of them is to some extent insectivorous and in a small degree frugivorous. In Hawaii at the present time the blossoms of the largest Ohia trees furnish by far the most abundant supply of nectar, and it is while rifling these of their sweets that the Oo is usually seen. In the winter months the birds are often in scattered pairs throughout the forest in a favourable locality, but after the breeding season and while the young are still following their parents, many congregate in a small area, and at such times we have seen as many as a dozen in a single tree. The Oo is very agile in its movements when feeding amongst the Ohia flowers, gliding and darting from bloom to bloom and from limb to limb with great rapidity, at one moment one side, and the next far away on the other side, of some giant tree. It is very intolerant of the scarlet Iiwi (*Vestiaria*), and will at intervals suspend its feeding to chase away any of these that have ventured into its own tree, or it will even leave this, however profuse be the blossoms, to drive from some distant tree one that it has chanced to spy there. This aggressiveness appears so wanton and unnecessary, and so frequently interrupts its own feeding, that one suspects it must be an ancient habit, which has survived from a time when either nectar-producing flowers were scarcer, or the birds which fed upon them were much more numerous. In attacking the other nectar-eating birds it makes a savage rush on the one that excites its animosity, and as in making this attack it frequently erects its tail with the long twisted feathers, and also raises its wings, so that the yellow axillary feathers and under-tail-coverts of the same colour can be distinctly seen, it presents a very fine appearance. When in company with its mate at or before the nesting season it likewise frequently assumes this position, and indeed various other postures and antics. After the nesting season the old and young together may be seen at only a moderate height in the Ohia trees, often amongst the masses of climbing Ieie, with which the trunks are clothed. On the red fruit of the Ieie the old birds sometimes feed, and at some seasons they are rather partial to caterpillars and some other insects. Their economic value in the forests is, however, not to be compared with that of many of the Drepanididae, both because the number of insects destroyed by them is much less, and because many of the insects killed are by no means injurious, and some are even probably beneficial. As a destroyer of insects the small Kauai Oo (*A. braccatus*), which is more specially adapted for climbing on the trunks of trees, is incomparably their superior. However at times I have seen *A. nobilis* leave the flowers of the Ohia to hunt amongst the foliage of a Koa in the more open forest, insects no doubt being the object of these visits.

The Molokai or Bishop's Oo (*A. bishopi*) does not greatly differ in its habits from the Hawaiian bird, except that in its case these habits are probably more natural, either because it was less hunted by the natives, or because it ceased to be persecuted long before the Hawaii species, owing to its diminished numbers. That it was hunted to some extent is certain from the fact that in the possession of an old native woman I found a large collection of the yellow feathers of this bird, some loose and some already tied in bunches with Olona fibre. That these had been obtained from birds caught alive and not shot was evident, as many feathers still showed traces of the bird-lime. Bishop's Oo is a great nectar-eater, and it visits the Lobeliaceae, or rather certain species of these, in preference to any other flowers. At times it may be seen numerously in the Ohia trees, when these are in flower, but this is clearly because its favourite lobelia nectar is unattainable. Thus on one of my visits to Molokai of about a score of the Oo that I watched while they were feeding, at a time when the Ohias and lobelias were both in flower, one only was seen to visit the former, though these were attractive enough to other birds. This Oo also visits the flowers of the banana in some of the deep gulches and valleys, and is said to also eat the fruit. To insect food, when the nectar of the lobelias is abundant, it pays little attention. Thus of ten shot at the lobelias and dissected not one contained a trace of insect food, although these were secured on different days and at very different times of day. On the other hand, the one mentioned above as visiting the Ohia flowers at this season contained a considerable amount of insect food.

When seen in the low brush of the Molokai forest the Oo is a somewhat inquisitive bird, but restless and timid when nearly approached, far more so than are most of the other forest birds that are found with it. It is easily called by imitating its cry, though it will not infrequently come and inspect the intruder uncalled. At such times the mixed timidity and curiosity of its nature are nearly always shown, and it rarely exposes itself to more than momentary view, diving beneath the foliage of the bushes at the faintest alarm, and sometimes only thrusting out its head and neck from beneath the leaves to renew its inspection.

The cry of the Oo is unlike that of any other native bird, and no one who has once heard and identified it can ever again be in doubt as to the bird that utters it. This cry is usually dissyllabic, as represented by the bird's name, but sometimes may be represented by only a single sound. It varies somewhat, especially in loudness and clearness, according to the season, and is either uttered once or repeated. Thus at certain seasons the usual cry of the Molokai bird at its fullest was well represented by five syllables, '*owów, owów, -ów*,' the first and the second, as likewise the third and fourth, are practically continuous, with the stress on the latter in each case; there is a slight pause between the first and second pair of syllables and generally a longer and distinct one between the latter of these and the final one, which is extremely loud and might at times be almost termed a shriek. These cries are naturally audible at a great distance, and I have estimated that I have heard the cry of the Hawaiian species when half a mile from the bird, and that of *A. bishopi* is certainly sometimes audible at a distance of at least 3000 feet. When the former assemble in large numbers in the flowering Ohias, their cries are incessant, and are uttered not only from the trees but sometimes even on the wing, as the birds continually pass backwards and forwards from one tree to another. In fine weather they are mostly silent during the hotter hours, but in wet or foggy weather are often vociferous throughout the day. The Oo of Hawaii, apart from the cries above mentioned, has also a distinct song though it is extremely rarely heard, never uttered so far as I know from the tall Ohias, but always from some thick bush of the undergrowth. Contrary to what might be expected from the nature of its cry, this song is by no means loud. I have heard it only once or twice, even where the bird was very abundant.

The dwarf Oo, or Oo-aa, of Kauai as already mentioned differs considerably from its allies in its general appearance and structure, as well as in its habits and song. It retains to a considerable extent a like fondness for the nectar of flowers, whether those of the Ohia, the Lobeliaceae, or the banana. Its affection for the lobelias is often betrayed by their characteristic pollen sticking to its forehead, even when it is not seen in the act of visiting these flowers.

But it is in being much more largely insectivorous that it strikingly differs from its congeners, and in accordance with these habits its structure is somewhat modified. Thus while the long, weak plumes of the tail in the allied species are specially so modified for aesthetic purposes, in the Oo-aa they are stiff and pointed and aid it greatly when climbing on the trunks of forest trees, as is its common habit. Although its tail lacks the elegance of form, lacks too the special colour adornment of white tips, exhibited in some degree by the others, and has no yellow under-coverts for display, yet it retains the habit of erecting and flirting this, and indeed generally assumes postures similar to those of its more showy relatives. For insects it hunts freely on the trunks of the largest Ohias, to which its powerful legs and claws aided by the stiff tail enable it to cling, woodpecker-like, while it searches on and beneath the bark. One's attention is frequently attracted to its presence by the rattling of large loose strips of the bark, beneath which it is seeking its prey. The food found in such situations consists of spiders, native cockroaches, the Prognathogryllid crickets, and the smaller ones of the genus *Paratrigonidium*, as well as some beetles and the larvae of these insects. Of course too it feeds on the ubiquitous Geometer caterpillars as well as on some wood-eating species, and unlike the Hawaii bird is very fond of the Koa trees, frequenting these even for choice in some localities. It is however abundant in forests where the Koa is wanting. Lesser forest trees it also visits, especially the Kalia (*Elaeocarpus*), so common a forest constituent on Kauai. This Oo is much tamer than the other species and is of a sociable disposition, little companies of from four to eight being frequently observed together, when all are fully adult. It also not infrequently joins the assemblages of insectivorous Drepanids.

The Oo-aa is always pleasant to hear, for its song though loud is very clear and melodious. Numerous as it is in many parts of the Kauai forests, in the early morning and again towards dark the woods fairly resound with its notes and the wild song of the even commoner Amaui (*Phaeornis*). Yet in these notes one can readily detect some resemblance to the cries of the other species of Oo, as though in the Kauai bird they were mellowed down and woven into song. The cry of the female when she is greatly alarmed is a mere reiterated squeak, utterly unlike her usual call, and would never be recognized at first hearing as belonging to any Oo. Nevertheless I have heard the Molokai species under similar conditions utter just such a cry, and I suspect that the female of the Hawaii species may do the same. My friend Mr G. C. Munro, if I remember rightly, once informed me that the Oo-aa both in its song and habits reminded him somewhat of the New Zealand 'Tui' (*Prosthemadera novae-zealandiae*), and the dark plumage of the Hawaiian genus likewise calls to mind that Meliphagine bird.

In forests consisting, so far as the large trees are concerned, almost entirely of Koa, I have often seen what is, no doubt, the nest of the Kauai Oo. These nests were always built in the topmost branches of these trees, and formed of dead twigs and dry phyllodes. They are of inartistic and flimsy construction, and when viewed from beneath the light usually shines freely through the interstices. Probably the other species of Oo will be found to build similar nests in the top of the tallest Ohia trees, as no doubt the Kauai species itself also does in many localities, only in the denser foliage of the Ohia it is almost impossible to detect them from below.

Even in recent years large numbers of the Oo of Hawaii have been caught with birdlime, after the manner of the old bird-catchers. Some of these were distributed on the other islands, and I was told that on Kauai they were still alive a year or two after they were turned loose. These birds are easily kept alive in captivity, and will live for a considerable time on the juice of the sugar-cane, and probably for the natural term of their lives if freely supplied with their favourite nectar-producing flowers. They were habitually kept thus by the old-native birdcatchers to serve as decoys, as also were some of the Drepanididae, and are said to have become tame and reconciled to confinement.

(1) *Acrulocercus nobilis*, Merr.

HAB. Hawaii in many and probably all the districts, but less numerous than formerly.

(2) *Acrulocercus bishopi*, Rothsch.

HAB. Molokai, both on the leeward and windward sides, but much less numerous than formerly.

(3) *Acrulocercus apicalis*, Gould.

HAB. Oahu formerly, probably extinct.

(4) *Acrulocercus braccatus*, Cassin.

HAB. Kauai, common and very generally distributed in the forests.

CHAETOPTILA Peale.

Native name *Kioea.*

The native name of *Chaetoptila* appears to have been the same as that applied to the bristle-thighed curlew (*Numenius tahitiensis*) but there is no reason to doubt the correctness of this name, which is applicable enough to either species.

There are very few specimens of this bird in collections, and it is now very probably extinct, the last that were obtained being, no doubt, those which were in the Mills collection, and which are now divided between Cambridge, Honolulu, and the Tring Museums. It is not known in what locality Mills' specimens were obtained, and although many of his species are supposed to have come from Olaa, it is very doubtful whether the *Chaetoptila* was found there. It is much more probable that it was confined to the high plateau between the mountains and the upper edges of the forest bordering this, where it was observed by Pickering and Peale of the United States Exploring Expedition. Here it frequented the flowers of the Ohia, apparently having much the habits of the Oo and a loud 'chuck' as its call.

(1) *Chaetoptila angustipluma* Peale.

HAB. Hawaii, perhaps now extinct.

Fam. FALCONIDAE.

The Falconidae are represented by three species only, and of these but one, the Hawaiian buzzard, is peculiar to the islands or of any special interest. The other two *Circus hudsonius* and *Pandion haliaetus* appear to be casual and more or less rare visitants, and I am not aware that either of these has been observed to breed in the islands.

BUTEO Cuvier.

Native name *Io.*

The Hawaiian Buzzard or Io is restricted to the large island of Hawaii, whereon it has a wide distribution, and in several districts is far from rare. As is well known, it has two markedly distinct phases, a light and a dark one, which so far as I know are in nowise connected by true intermediate forms, and were they not said to interbreed, would have all the appearance of being distinct species. The individuals of these two forms are by no means evenly distributed over the large island. Thus in middle Kona all that I observed in two or three visits belonged to the light form, further north both this and the melanochroic form occur together, in Olaa and on the 1880 lava-flow above Hilo the 8 or 10 examples that I examined with the naked eye or field-glasses were all of the dark form. Mr H. W. Henshaw, however, has informed me that on windward Hawaii the light form also occurs. This ornithologist, who has paid much attention to the Io, and has amassed a large series of skins, has also informed me that the adult and immature plumages of the bird have been totally misunderstood by writers on Hawaiian birds, the supposed immature bird being really the adult. I have no doubt as to the correctness of Mr Henshaw's[1] observations, but am not at all surprised that the mistake should have occurred. In 1892 in Kona I found two or three nesting pairs of the Io at an elevation of about 3000 ft. above the sea, and each of these pairs was in the plumage which in Wilson's work is considered that of the adult. I did not see any nesting specimens of the bird with the white or pale buff head, but only solitary individuals, and should myself have considered these to be immature birds.

In Kona the range of the Io is from a hundred or two hundred feet above sea-level to 5000 ft. and perhaps higher. The nests that I observed were in each case built in a large Koa tree and at no very great height from the ground, and in such parts of the forest as lie within the rain-belt, from 2500—3500 ft. above the sea. When the young are hatched the parent birds are very bold and can hardly be scared away from their nests.

The Io is a gross eater, and many of those that I have seen have been so crammed with food as to be very unwilling, and one was apparently unable, to fly. At such times it frequently retires to rather dense cover, perching alone on one of the lower boughs of a forest tree, and when intruded upon and closely approached, exhibits its concern only by such slight movements of the head as are necessary to keep an eye on the disturber of its rest. It is curious that, although I have by no means rarely come across the Io while thus resting, and in spots abounding in smaller forest birds, I never noticed that it was mobbed by the latter, as the owl sometimes is. Peale however says that small birds are its food, a statement which I am unable to corroborate, although on rare occasions it certainly does catch these. Mice are certainly a much more common food, and I have taken five full-grown ones from one bird, and from another four or five smaller ones and a large part of an adult Californian quail. Sometimes the Io contains no food other than insects and spiders, especially the large *Argiope avara* of the latter, and large caterpillars and larvae of large beetles (*Parandra* and *Aegosoma*) of the former class. In seeking the *Argiope*, the webs often stick to the legs and even other parts of the body, and dirt and other objects adhere to these and sometimes form a compact mass, with difficulty removed. In the Olaa district I caught an Io of the melanochroic form so weighed down in this manner, and its feathers so glued together, that it was unable to fly at all.

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[1] Since the above was written Mr Henshaw has published some notes on the Io in 'Ibis,' July 1902, p. 386.

On account of its sluggish habits, conspicuous appearance, and slow flight the Io is not so common but that it might be exterminated comparatively easily, and indeed it has been slaughtered without just cause in some localities. It should rather be protected as a beneficial species, for it is far more useful than injurious. Like the crow at certain times it soars to an enormous height in the air and this fact renders the restricted range of both these birds all the more curious, as one would suppose that they would be, if not voluntarily, yet as a rare occasion and perforce, carried to the other islands and established there. This however appears not to be the case, and the occasional report of a hawk on Maui probably refers to one of the following species.

(1) *Buteo solitarius* Peale.

HAB. Hawaii in all districts; not rare and in some localities common.

CIRCUS Lac.

(1) *Circus hudsonius*, Linn.

HAB. Oahu, and probably other of the islands, as an occasional immigrant.

PANDION Sav.

(1) *Pandion haliaetus*, Linn.

HAB. Oahu as a stray, and I have heard it reported from Kauai and Niihau. Dole reports it from Niihau, Molokai, and Hawaii. I saw two examples of the Osprey on the coast near Waialua and one near Waianae in the winter of 1893–94. The latter may, however, have been the same bird as one of the other pair.

Fam. STRIGIDAE.

Asio Brisson.

Native name *Pueo*.

The Pueo or short-eared owl is the sole representative of its family in the Hawaiian group, where it is common on all the islands. Nevertheless it has decreased in numbers of later years partly owing to the increased area of land under cultivation, and partly because it is said to carry off young chickens and is consequently shot.

It is essentially a bird of the open country, frequenting chiefly the grassy slopes of the mountains below the forest, and the flat lands near the coast, but it visits the forest at times, even where this is moderately dense. I have more than once seen it in this situation, well within the forest on Haleakala, my attention being in each case attracted to its presence by the mob of small birds (chiefly the *Oreomyza*) which flocked around it with much chattering, but always keeping at a respectful distance. I have little doubt that it occasionally preys on some small bird, at such times as mice and rats are scarce. These latter are certainly its chief and usual food and have always been found in such birds as I have dissected. It is for these that the owl is hunting when it is hovering over the open grass lands, where mice are usually very abundant. In its habits it is both nocturnal and diurnal, for it may be seen on the wing in the brightest sunshine and heard in the middle of the blackest night. It is most active however as a rule in the early morning and in the latter part of the afternoon, when many individuals may be seen at the same time hovering at some distance from one another.

In the breeding season when the nest is approached the old birds will keep passing to and fro above the head of their disturber, and frequently follow him for a considerable distance. The eggs are laid on the ground amongst grass or Ilima scrub.

The short-eared owl of the islands is smaller in some of its measurements than are examples from other countries, and Bloxam's name of *sandwichensis* has been revived for these. Individuals of the island bird however exhibit no little variation in measurements, and even were this not the case, the distinctions between it and the others are so trivial as to hardly deserve a special name.

The short-eared owl is subject to the attacks of two parasitic[1] Hippoboscid flies, a larger and a smaller, one or both of which has been found on most specimens that I have shot.

In the old days the owl was not only very numerous but very tame. At the time of the discovery by Cook they are spoken of as 'owls which they have very tame,' which may perhaps mean that they were actually kept and tamed. At least we know that they were sacred, and the owl god one of considerable power, and by no means every native of the present day cares to kill one of these birds.

(1) *Asio accipitrinus*, Pallas.

Hab. All the islands. Very common in many localities.

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[1] *Olfersia acarta* Sp. and *Ornithoica confluenta* Say, var. *peroneura* Sp. Vol. III. Pt II. p. 87 and p. 91 of this work.

Fam. CHARADRIIDAE.

STREPSILAS Ill.

Native name *Akekeke.*

The Turnstone is a regular migrant to the islands, arriving at about the same time as the Golden Plover, the two frequently forming mixed flocks. In its general habit it in many respects resembles the latter (q. v.).

(1) *Strepsilas interpres,* Linn.

HAB. All the islands; abundant.

CHARADRIUS L.

Native name *Kolea.*

The golden plover visits the islands regularly and in great numbers each season, after rearing its young in Alaska. The earliest immigrants usually arrive during the second or third week in August, at the same time as, and sometimes actually in company with, the Akekeke (*Strepsilas*), and both remain in the islands until the following April, when they return to their nesting-places in the North. Not all the individuals of either of these species however depart with the majority, a very small percentage of each remaining throughout the summer months. In 1893 I noticed several flocks of mixed Akekeke and Kolea throughout the summer months on Molokai, generally in company with the stilts, which frequented the mud-flats, and I have seen similar companies since on other of the islands. Certainly those that remain never breed in the islands, and they are mostly old and sterile or immature birds, since those that I examined had not assumed the nuptial plumage.

This plumage is at its finest, as also is their bodily condition, shortly prior to their departure to Alaska, but on their first arrival thence some still retain their black feathering.

When about to return to the North the Kolea frequently assemble in very large flocks and before setting out on their journey rise to an enormous height in the air, even beyond the range of sight. I have several times witnessed these departures, always late in the afternoon, or just before dark. I have once seen two such flocks start from the same point, the one following the other after an hour's interval.

In many parts of the islands large numbers of Kolea and of the Akekeke habitually resort to the margin of the sea and the extensive mud-flats for feeding purposes, but the greater part scatter over the low-lying grass lands and the open mountain country, where they may be found even as high as five or six thousand feet above the sea. In such localities they find abundant food in the caterpillars of various Noctuid moths, and indeed in the moths themselves. Of all the island birds the Kolea is beyond question the most valuable to the grazier and the agriculturist, and it is singularly unfortunate that it is a most excellent bird for the table, and at the same time the one most generally sought after by sportsmen.

I have been at some pains to learn exactly the species of Noctuidae which form the favourite food of the plover, whether as moth or caterpillar, and I have several times shot the bird at the instant that it has seized a moth in its hiding-place at the roots of grass. I am therefore able to state positively that it catches the moth both of *Agrotis crinigera* and *dislocata*, the caterpillars of which are the two most extremely injurious and wide-spread of all the island 'cut-worms.' It also obtains the caterpillars of both these and other species and feeds as is well known to an enormous extent on the grass army-worm (*Spodoptera mauritia*), a caterpillar which not only locally entirely clears off the freshly-grown grass, but also does some damage to the young leaves of sugar-cane.

For these reasons the plover is worthy of all encouragement by the agriculturist and should never be shot on or around his land, or if this is done, he should not complain when his crops are ravaged by cut-worms, as is too often the case.

Unfortunately again for the agriculturist the plovers, which feed inland, are generally in the habit of repairing at intervals during the day to the ponds so frequently found near the coast, either permanently, or temporarily during the rainy season, and it is during these visits that the greater number are shot over decoys. Even the crudest imitation of the bird is sufficient to attract those that come to drink within easy range of the shooter, who sits behind a blind. In this manner they are generally shot as they hover or wheel around the decoys at a distance of from ten to twenty yards from the blind, and the execution by even a moderate shot is necessarily considerable, while very heavy bags are frequently made.

It is therefore not to be wondered at that the Kolea is much less numerous than was the case formerly, and it will certainly become still less so in the future.

(1) *Charadrius fulvus* L.

Hab. All the islands.

(2) *Charadrius squatarola* L.

Hab. Hawaii (Hewitt), as recorded by Henshaw.

Fam. SCOLOPACIDAE.

Heteractitis Stej.

Native name *Ulili.*

The Ulili is a common bird in many parts of all the islands, usually frequenting the sea-shore and the edges of shallow ponds near the coast, feeding on molluscs, crustaceans, and small fish. In some localities however it ranges far inland, as along the course of the Wailuku river in Hilo district, where it may be found miles within the forest, as also in the large windward valleys of Molokai along the river-beds, and in similar localities on Oahu, Maui and Kauai. In these inland haunts those that I have examined were filled with the young of the Oopu and another small fish, and a pair of the birds are usually found together or not far distant.

(1) *Heteractitis incana*, Gmel.

HAB. All the islands; common.

LIMOSA Brisson.

(1) *Limosa baueri.*

HAB. Kauai (Gay); a casual visitant.

CALIDRIS Cuv.

Native name *Hunakai.*

(1) *Calidris arenaria*, L.

HAB. Most and probably all the islands. It is found on Niihau, and I have myself noticed it on Kauai, Oahu and Molokai. It is a regular visitant to the islands.

TRINGA Linn.

The two sandpipers named below, although they have been rarely noticed in the islands, are very likely not infrequent visitants.

(1) *Tringa maculata* Vieill.

HAB. Hawaii (Hewitt) as recorded by Henshaw.

(2) *Tringa acuminata* Horsfield.

HAB. Oahu (Judd); Maui (Newell).

GALLINAGO Steph.

(1) *Gallinago delicata* Ord.

HAB. Hawaii (Hewitt).

NUMENIUS Briss.

Native name *Kioea.*

The Kioea is found on most and probably all of the islands. I have seen it on Kauai, Oahu, Molokai and Maui, and it is found on Niihau. I did not observe it on Hawaii though it is no doubt there also. In some localities it is numerous, as in parts of Molokai, where it forms large flocks, which feed both on the open uplands and on the mud-flats along the coast. These flocks are often accompanied by the Kolea and Akekeke, and like these most of the curlew depart for breeding purposes, a few stragglers only remaining in the islands. When it is not much hunted the curlew is unsuspicious, and by whistling its cry, which is well represented by the native name, it can easily be attracted, especially if at the same time a cap or other object be thrown into the air. As it comes flying up against the wind, its large size and slow flight make it an easy mark as it passes overhead.

(1) *Numenius tahitiensis* Gm.

Hab. Probably all the islands.

Fam. RECURVIROSTRIDAE.

Himantopus Brisson.

Native name *Aeo* or *Kukuluaeo.*

The Hawaiian Stilt is a common and widely distributed bird in the islands and in some localities is abundant. I have seen it on Kauai, Oahu, Molokai and Maui, and it is also found on Niihau. On Hawaii and Lanai I did not observe it, but on neither of these islands did I visit any very likely-looking localities. The Aeo is by far the most interesting of the Hawaiian shore birds, since it is quite peculiar to the islands, and abundantly distinct from its nearest allies elsewhere. It is generally abundant in places where the receding tide leaves extensive flats of black mud exposed, feeding on the worms and other marine creatures which are found in such places. Here it forms small flocks of varying number, but sometimes consisting of twenty or thirty individuals. It is also found commonly about the brackish or fresh-water ponds, which are found on the lowlands at a short distance from the sea, but keeps entirely to the plains.

It is in the neighbourhood of such ponds that it generally lays its eggs, frequently on ground much roughened by the trampling of cattle, as it often is in the vicinity of water.

The old birds are most solicitous for their eggs and young, and will fly over the intruder's head, darting down within a few feet of him, reiterating their harsh cries. By these cries other pairs are soon attracted, increasing the din and joining in the feigned attack; to draw attention from the young the parents will further feign death or disablement. Nor is it in the breeding-time only that one is thus assailed by these birds, for sometimes a small flock will behave in this manner at other seasons. When standing on the ground they have, when disturbed, a habit of bowing and nodding; and a small flock of the Aeo performing these antics together is a grotesque sight.

Some years ago the stilt was a familiar object by the sides of the railroad a few miles out of Honolulu, as one passed in the train, but it is now rarely seen there, for it was often shot by those in quest of other shore birds.

It also was common on the quarantine island close to the town and there is no reason why it should not still be so. On other parts of Oahu it is still abundant.

On Molokai it is at certain times very subject to the attack of a tapeworm, of which unfortunately I neglected to preserve any specimens.

(1) *Himantopus knudseni* Stejn.

HAB. Niihau, Kauai, Oahu, Molokai and Maui. Common.

Fam. PHALAROPODIDAE.

Phalaropes not infrequently stray to the islands and I have seen them on the coasts of Oahu, Molokai and Maui, generally singly and in company with the common shore birds. I never shot at any of these and am unable to identify the species, but the following two have been collected by others.

PHALAROPUS Brisson.

(1) *Phalaropus lobatus,* Linn.

HAB. Kauai (Judd and ? Munro). I am not able to identify from memory with any certainty the species of Phalarope obtained by the latter on Kauai, and it may belong to the following species.

(2) *Phalaropus fulicarius,* L.

HAB. Maui (Newell).

Fam. RALLIDAE.

PENNULA Dole.

Native name *Moho.*

The small native rail, now probably extinct, was formerly a common bird, and on Hawaii widely distributed, since it certainly inhabited both sides of the large island, and was as well known to some of the oldest natives on the lee side as to those on the windward. Whether more than one Hawaiian species was included under the name Moho it would be impossible to say, and I have here sunk the *P. millsi* of Dole, as a synonym of the old *Rallus ecaudatus.*

The Moho was, however, certainly not confined to Hawaii, though it probably survived there to a later date than on the smaller islands. Thus it certainly inhabited Molokai, and the late Mr R. Meyer, when I stayed with him in 1893, assured me that when he first came to that island (some 30 or 40 years before) it was well known to the natives, and they even offered to catch specimens for him. Unfortunately at that time he took no great interest in the matter, which, as he told me, he much regretted afterwards. Not only did some of the Molokai natives quite recently know of the former existence of the bird on that island, but they still remembered and could imitate its cry, and further stated that the Moho were of two kinds some being 'redder' than the others. Now as nothing is known as to the sex or age of the few preserved specimens of Hawaiian Rails it is certainly far safer to consider these as belonging to a single species; for it is scarcely credible that two inhabited the same part of the small island of Molokai, while there is little doubt that the Molokai birds exhibited considerable individual difference, at least in colour. I obtained some evidence of the former occurrence of the Moho on other of the islands, but not with the definite information supplied on Molokai. It is more than likely that it was once found on all.

Both on Hawaii and Molokai the Moho frequented the open country below the continuous forest, and the open country covered with scrub that lies within the forest belt. Its last home on Hawaii appears to have been the rather open country which lies just outside the heavily timbered part of the Olaa district on the smooth or pahoehoe lava, and the country between the same heavy forests and the crater of Kilauea. There is little doubt that the specimens formerly in Mills' collection came from one or other of these two neighbouring localities. It is possible but not probable that the Moho still exists there.

In olden times the Moho and the small native rat (whatever species that may have been) shared the distinction of providing sport for the chiefs, who hunted them with bow and arrow. Indeed the Moho appears to have lived on friendly terms with these rats and is said to have even been in the habit of hiding itself in their burrows in times of danger. As the introduced mongoose in 1894 was already conspicuous in the last known haunts of the Moho, there is small hope that this flightless bird still exists.

(1) *Pennula ecaudata*, King.

HAB. Hawaii formerly; and this or allied species also once inhabited some of the other islands.

GALLINULA Brisson.

Native name *Alae ula.*

The Alae ula is generally distributed over the islands in suitable localities, often frequenting the rice fields and taro patches. It does not appear to follow the streams into the mountains, even where they seem quite suitable, the cover on the banks being abundant, and small fish, crustaceans and other food beyond its needs. I have dropped the specific name '*sandvicensis*,' as there appear to be no characters to distinguish the Hawaiian bird even as a constant variety. The colour of the tarsus varies in the amount of its redness and sometimes is not red at all.

Like the Buzzard, the Owl and many other birds the Alae ula figures largely in legends, and from this one would infer that it is at least a moderately old inhabitant of the Hawaiian group, and might be expected to show in its isolated island home greater distinctions from typical examples than it does. That it does not do so, may be due to the fact that it is less susceptible to change of environment than are most birds, but at the same time we have no proof whatever as to the complete isolation of the island Gallinules, and it may be that at intervals stragglers from outside arrive in the islands and interbreed with those already here.

(1) *Gallinula galeata*, Bon.

HAB. All the islands on the lowlands.

FULICA L.

Native name *Alae keokeo.*

The Coot is less widely distributed than the Gallinule although it probably exists in some localities on all those islands which possess ponds of any considerable size, in the neighbourhood of the coast. I saw it commonly on Kauai, Oahu, Molokai and Maui frequenting ponds of either fresh or strongly brackish water, as well as on the larger streams at a short distance from the coast.

On many of the shallow brackish ponds which are devoid of a fringe of rushes or of any vegetation, the nests are often built in the water far from the edge, and consist of a large pile of sticks and twigs, resting on the mud and rising well above the surface. The material in such a nest where the water is two feet deep is very considerable and frequently consists of the branches and twigs of the Algaroba or any other tree that grows near the pond. In less open localities and where aquatic vegetation is abundant, rushes, grasses and sometimes the leaves of the *Pandanus* provide material for the nest.

The coot forms flocks of considerable size and I have seen fifty or a hundred together on a fair-sized pond. When many foreign ducks arrive, the Alaes are on some ponds inclined to keep to themselves, and though strong on the wing they are less willing to leave the water than the ducks. If compelled to do so by one's wading in from the sea side they will pass overhead affording some pretty shots, and generally in the absence of other ponds alight a considerable distance out at sea, but within the reef On less open waters they are generally much tamer and may even with due care be watched at a very short distance, as they hunt for food along the edges of the thick rush beds.

Occasionally the frontal shield instead of being white is of a rich dark chocolate-brown colour. I shot one such specimen on Oahu in 1892 and have seen others since.

Whether this variation is due to age I do not know, but the natives called it by a different[1] specific name.

(1) *Fulica alai* Peale.

HAB. Most of and probably all the islands; common.

Fam. ARDEIDAE.

NYCTICORAX Rafinesque.

Native name *Aukuu.*

The Aukuu is a very common bird and is found on all the islands. It is even seen in the town of Honolulu, and one or more were frequently noticed resting in the daytime in the tops of the mango or tamarind trees which grew in the garden of one of the city hotels. Though it sometimes feeds during the daytime it more usually rests during the heat of the day and till near dusk, either in the top of some tree with dense foliage or standing in or near some pool of water, or on the mud-flats of the coast. It follows the mountain streams far inland feeding here, as elsewhere, on small fish. The heronries of the Aukuu often contain many nests and are sometimes found near the coast in the Lauhala trees (*Pandanus*), but more often from four to seven miles inland in the groves of Kukui (*Aleurites*) which flourish at 1000 ft. or more above the sea, by the side of the mountain streams. In one such heronry that I examined on Oahu in March the young were already all hatched.

(1) *Nycticorax griseus*, Linn.

HAB. All the islands; abundant.

ARDEA Linn.

(1) *Ardea sacra* Gm.

HAB. Recorded by Dr Finsch who saw it on Maui. Dole's remark that it is common all over the group of course refers to the preceding (*Nycticorax*).

Fam. IBIDIDAE.

PLEGADIS Kaup.

(1) *Plegadis guarauna*, L.

HAB. Kauai (Knudsen), Molokai (Munro), and also reported from Maui. A chance, but probably not infrequent, visitor, since very small portions of the coasts are examined each year, and even these far from systematically. The bird has been described to me more than once by casual observers.

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[1] The Alae awi is known to natives of Oahu, Molokai and Maui; it differs from the Alae keo as follows: frontal shield dark rich chocolate (redder after drying), beak white but the lower mandible with two red-brown spots, which are separated by a bright yellow line, a little behind the tip; the upper mandible has a single transverse red-brown spot placed above those on the lower. Legs down to and including the basal joint of toes bright apple green in front, except the joints themselves.

Fam. ANATIDAE.

There are five geese and twelve ducks known to have occurred in the Hawaiian islands proper, but of these 15 are either regular or casual visitants and are of little interest. No doubt this list (which can be depended on) will be further[1] increased, some of the species here mentioned, not previously recorded from the islands, having been noticed by several of the more observant sportsmen. A list embracing nearly all the species here included has been kindly furnished me by Mr S. G. Wilder.

ANSER Brisson.

(1) *Anser albifrons* var. *gambeli* Hart.

HAB. Hawaii (Palmer).

CHEN Boie.

(1) *Chen hyperborea*, Pall.

HAB. Maui (Newell); also known on Oahu.

BERNICLA Steph.

Native name *Nene*.

The Nene is widely distributed on the island of Hawaii and in some localities is a fairly common bird, and it is said to have formerly frequented Haleakala, Maui, although neither in my many visits to the summit, nor when camping in the bottom of the great crater, did I myself get sight of one. From the fact that parts of the crater as well as much of the higher slopes of Haleakala are extremely similar to some of its favourite haunts on Hawaii, and produce also some of its favourite food in abundance, its scarcity on Maui at the present time (if indeed it still exists there at all) is remarkable. The other islands are quite unsuited to its natural habits, and it is not found on these, though stray foreign geese are often mistaken for it.

As is well-known the Goose, like many other native birds, changes its abode at different seasons of the year, being no doubt chiefly influenced by the food-supply. In the summer months it affects the open upland region, which is covered with a scrubby vegetation and traversed by many lava flows, such for instance as parts of the plateau between the three great mountains of Hawaii, at an elevation of four or five thousand feet above the sea. Near the crater of Kilauea about two miles from the Volcano House hotel flocks of some size may be occasionally seen in the later summer. In such situations it feeds on the abundant Ohelo berries (*Vaccinium*), on the wild strawberry (*Fragaria chilensis*) where the cattle still allow this to exist, and still more commonly on the black berries of the creeping *Coprosma*, one of the commonest plants in some of its favourite localities. In the winter months large numbers of these upland geese resort to the lowlands and remain there for such time as the vegetation is fresh and green, and they are said to breed during this season. I have not been able to learn that the Nene ever visits the brackish or other ponds of the lowlands, as do stragglers of foreign geese, which are often mistaken for it; and in many of its upland haunts it certainly seems to avoid the wetter and more marshy localities. In captivity however, it sometimes acquires a very decided liking for water and will enter it readily enough.

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[1] The Emperor Goose (*Philacte canagica*) has now been added by Mr H. W. Henshaw (Auk, Vol. XX. (1903), p. 164).

Like so many other members of the native Avifauna, the goose is becoming less common than in former years, and unless stringently protected at all seasons will probably become extinct. Its extinction would be a source of much regret, for apart from the scientific interest attached to the bird, its appearance is striking and beautiful, and it is highly characteristic of some localities, themselves remarkable, and almost or quite untenanted by other native birds.

(1) *Bernicla sandvicensis* Vig.

HAB. Hawaii; widely distributed. Also said to inhabit (or to have inhabited) Haleakala, Maui, but the specific identity of the birds from the two islands is not proved.

BRANTA Scop.

(1) *Branta canadensis* var. *minima* Ridgw.

HAB. Kauai (Palmer).

(2) *Branta nigricans* Lawr.

HAB. Maui (Newell).

OBS. Brant geese are frequently met with on one or other of the islands during the winter months. During the period of my collecting in the islands I myself noted or was informed of stragglers or flocks of these birds on all the islands excepting Lanai and Niihau, but the species were not identified.

ANAS L.

(1) *Anas boscas* Linn.

HAB. Oahu, Molokai and probably the other islands, as a straggler amongst the flocks of common migratory ducks. On the latter island one was shot by me casually amongst a very large flock of shovellers. Schauinsland has reported it also from the outlying island of Laysan.

(2) *Anas wyvilliana* Scl.

The Koloa maoli or true native duck of the islands is a most interesting species, and it is remarkable that it has received scant attention from the resident ornithologists

—the more so as it is common enough on nearly all the islands. I have noticed it plentifully in many localities on Kauai, Oahu, Molokai, Maui and Hawaii, in fact on all the islands visited by me, excepting Lanai, but in no one locality have I been resident sufficiently long to make out satisfactorily the connection between the very different varieties that it presents. The extreme forms represented are so very different, that at first sight they might readily be mistaken for distinct species, but they are certainly connected by intermediate examples.

It is hardly possible to doubt that *A. wyvilliana* is a dwarfed descendant of *A. boscas*, which in many respects it so much resembles, and to which it is certainly more nearly allied than to any other species (excepting perhaps the still smaller Laysan duck (*A. laysanensis*), which I have not had an opportunity of examining). Thus the voice of the Koloa is quite that of the mallard, excepting that in accordance with its lesser size it is less loud. So too the full-plumaged drake has the recurved tail-coverts like those of the male *boscas*—at least in some individuals. If however many specimens of the Koloa be examined when paired either prior to, or during the breeding season, it is evident that by no means all the drakes possess these recurved feathers, and further that there is much individual variation in the amount of modification of the tail-coverts, some showing only a slight trace of this. Perhaps not more than one in seven of the adult drakes have the tail-coverts conspicuously modified.

As the common mallard is now occasionally, though rarely, found in the islands and even reaches the still more remote island of Laysan, it at first sight would appear unlikely that the native duck could be a descendant of that species, for the occasional arrival of fresh individuals would do away with any true isolation. It must be remembered that if a mallard is now on rare occasions killed or noticed, we can be sure that its occurrence in the islands is not very infrequent, because, as I have previously stated, the islands are very incompletely and irregularly searched for stray specimens of foreign birds. Such mallards as are now occasionally noticed, appear to be simply stray birds amongst the large flocks of regular migrant foreign ducks. It is therefore probable that the native duck was descended from certain stray mallards which reached the islands by some remote chance at a time long prior to the regular winter immigration of shovellers and pintails, which now naturally enough bring an occasional mallard with them. Indeed one would surmise that a very long period of isolation would have been necessary for it to acquire its specific distinctions, when one considers the enormously wide and varied range that the parent *boscas* occupies without noticeable variation. Whether these immigrant mallards of the present day ever remain in the islands to interbreed with the native duck is uncertain, but it is much more probable that they invariably return with the flock in company with which they came to the islands. I cannot find that a mallard has ever been seen except in such company and in the winter season. If the native duck interbreeds at all (and the variability of the species has led to some suspicion of hybridism) it is far more likely to do so with the domestic duck, in company with which I have occasionally seen it in the rice fields and elsewhere. For my own part I believe the individual differences exhibited by the Koloa to be simple variation, such as is frequently shown even in a far more striking manner by other creatures, which like the duck are the sole indigenous representatives of their genus in the islands.

As to its habits the Koloa is equally at home on the hottest coasts, where suitable ponds are found, or in the mountains, where I have noticed it as high as seven or eight thousand feet above the sea-level. In the uplands it chiefly affects the mountain streams, whether flowing through open country or heavy woodland, and may be seen in some numbers on small ponds, where these are found. Not infrequently it is to be found in boggy parts of the forest, which are quite heavily timbered, frequenting the tiny pools of water that collect in hollows in such situations. Along some of the larger streams, which flow through heavy forest, the Koloa breeds regularly, as also about the ponds on the lowlands adjoining the coast. It is very irregular in its nesting time. In some localities at an elevation of 4000 ft. the flappers are in fine condition in August. On New Year's Day 1893 I flushed and shot a duck and drake near the coast at Waialua, and, when I went to gather them, I found that they had already hatched a large brood of young. The majority of native ducks, however, breed between March and June. Even in the precipitous mountains many scattered pairs frequent the small pools that form at the foot of waterfalls, temporary or otherwise, leaving these haunts at night-fall to visit the rice and taro patches of the valleys below. Such individuals when shot, frequently have their crops filled with the ripe grains of rice. They are also very partial to the various kinds of molluscs frequenting fresh or brackish water, to the larvae of dragon-flies and such other animal or vegetable food as is accessible to them.

Though small the Koloa is a good bird for the table and is yearly shot in great numbers by sportsmen, chiefly about the ponds on the plains, but to some extent in the mountains also. On the mountain streams it is generally tame and as it rises slowly from the water and in easy range it affords the easiest of marks. For this reason and because many of its haunts are overrun with the introduced mongoose, it is in some localities becoming much scarcer than formerly and in others has practically disappeared.

As has been above stated the voice of the Koloa is that of a mallard and it has the same habit of quacking loudly as it rises from the water.

HAB. All the islands where are ponds or streams.

MARECA Steph.

(1) *Mareca americana,* Gm.

HAB. Oahu and Maui; as a straggler with the other immigrant ducks, also recorded from Laysan.

QUERQUEDULA Steph.

(1) *Querquedula carolinensis*, Linn.

HAB. Known to sportsmen as an occasional visitant.

SPATULA Boie.

(1) *Spatula clypeata*, L.

HAB. Most and probably all the islands; common.

DAFILA Steph.

(1) *Dafila acuta*, L.

HAB. Most of the islands with the preceding; common.

CHAULELASMUS Bonaparte.

(1) *Chaulelasmus streperus*, Linn.

HAB. Oahu; noticed by sportsmen as rare immigrant.

FULIGULA Steph.

(1) *Fuligula marila*, L.

HAB. A stray visitant like the preceding.

(2) *Fuligula vallisneria*, A. Wilson.

HAB. Another stray visitant.

CHARITONETTA Stejn.

(1) *Charitonetta albeola*, L.

HAB. Oahu, Maui; also recorded from Laysan.

MERGUS L.

(1) *Mergus serrator* L.

HAB. Several of the islands, well-known to some sportsmen.

Fam. FREGATIDAE.

FREGATA Cuv.

Native name *Iwa*.

(1) *Fregata aquila*, L.

HAB. Several and probably all of the islands occasionally. It breeds abundantly on the outlying island of Laysan.

Fam. SULIDAE.

SULA Br.

(1) *Sula fiber*, L.

HAB. Niihau; and probably other of the islands occasionally.

(2) *Sula piscator*, L.

HAB. Niihau, Kauai and Oahu; and probably at times on the other islands.

Fam. PHAETHONTIDAE.

PHAETHON L.

Native name *Koae*.

(1) *Phaethon lepturus* L. and D.

The Koae is an abundant bird on all the islands, nesting freely in the precipitous cliffs bounding the valleys and larger gulches, and it may often be seen in the daytime flying around in the vicinity of its nesting place. Sometimes however the nest is formed in less inaccessible places, as on the sloping side of a large gulch, and can be examined without any actual climbing. The birds are not rare even in the immediate neighbourhood of Honolulu, and in southerly storms their harsh cries are frequently heard overhead in the city itself and in the neighbouring valleys during the hours of night.

(2) *Phaethon rubricauda*, Bodd.

HAB. Niihau, Kauai, Oahu, Hawaii; and probably the other islands. The red-tailed Koae in the main islands of the group is much rarer than the preceding species. It becomes much more abundant on some of the islands to the north-west of these, nesting freely there.

Fam. PROCELLARIIDAE.

OESTRELATA Bon.

Native name *Uau*.

(1) *Oestrelata phaeopygia* Salvin.

The Uau is common in many parts of the islands, nesting in the high mountains, where it forms large colonies. The young were formerly killed in great numbers by the natives, who pulled them from the burrows by means of a stick split at the end, which was twisted in the down, just as rabbits which refuse to bolt are sometimes extracted by the fur. The old birds also were captured in nets as they returned from the sea inland, the hunter calling them nearly to the ground as they passed overhead in the dusk. Apparently when rising from the downward swoop, which followed the hunter's call, they became entangled in a large spread-net, but accounts vary as to the method employed. As the Uau in returning from the sea generally follow the same course, a spot in the line of flight was selected, and their capture was rendered comparatively easy.

HAB. All the larger islands. Common locally.

BULWERIA Bon.

(1) *Bulweria bulweri* J. and S.

HAB. Kauai, Hawaii; and no doubt other of the islands.

PUFFINUS Br.

(1) *P. cuneatus* Salvin.

HAB. Kauai; and probably on other of the islands. It is known to the natives as Uau kane.

(2) *P. newelli* Henshaw.

HAB. Kauai, Maui, Molokai; and probably the other islands, where are deep valleys with precipitous sides.

OBS. I once found several dead and partially decayed specimens of this bird at the head of one of the deep valleys of windward Molokai some days after a severe storm. Near the top of the precipitous cliffs at the side of the valley the natives informed me that there were extensive colonies of a petrel (which they called Uau) at the nesting season. It is quite probable that these were really the present species, though they may have been the true Uau (*Oestrelata*).

OCEANODROMA Reich.

(1) *Oceanodroma cryptoleucura,* Ridgeway.

HAB. Not rare on Kauai, where it has been collected by Messrs Gay, Knudsen, Munro and others, and it will no doubt be found on the other islands.

Fam. DIOMEDEIDAE.

The two following species of Albatross are found in the main islands of the group only as stragglers, *D. immutabilis* breeding in countless numbers in the outlying islands to the north-west.

DIOMEDEA L.

(1) *Diomedea nigripes* Aud.

HAB. Occasionally noticed on some and probably found on all the islands.

(2) *Diomedea immutabilis* Roths.

HAB. Several and probably all the islands.

Fam. LARIDAE.

STERNA L.

(1) *Sterna fuliginosa* Gmel.

HAB. Kauai, Oahu; and probably the other islands.

(2) *Sterna lunata* Peale.

HAB. Kauai; probably on the other islands.

(3) *Sterna melanauchen* Temm.

HAB. Kauai (Judd); and will probably be found as a straggler on other of the islands.

ANOUS Leach.

Native name *Noio.*

(1) *Anous hawaiiensis* Rothsch.

HAB. All the islands, and in many places abundant.

(2) *Anous stolidus* L.

HAB. Oahu; and no doubt other of the islands.

GYGIS Wag.

(1) *Gygis alba* Sp.

HAB. Recorded by Dole, probably correctly, as it is known to inhabit the islands to the north-west of the group. I can think of no known Hawaiian bird more likely to be the "white pigeon" reported by Cook's men than this tern.

LARUS L.

(1) *Larus barrovianus* Ridg.

HAB. Kauai, Maui; and probably other of the islands.

(2) *Larus glaucus* Br.

HAB. Hawaii (Henshaw).

(3) *Larus philadelphia* Ord.

HAB. Kauai (Palmer); a single stray specimen.

(4) *Larus californicus* Lawr.

HAB. Maui? (Newell); a single stray specimen obtained.

(5) *Larus delawarensis* Ord.

HAB. Maui? (Newell); a single stray specimen obtained.

(6) *Larus franklini* Sw. and R.

HAB. Maui (Newell). A casual visitor, once obtained.

OBS. Gulls are not infrequent on the coasts of Oahu during the winter months, but none appear to have been collected on this island. I have also several times seen them on other of the islands, always singly or in pairs. Their occurrence is of course accidental and of little importance, and the same remark might be made of many of the shore-birds, ducks &c. No doubt the list of these casual visitors may be considerably increased with an increase in the number of resident observers. That the list is as long as it is is due very largely to Mr Francis Gay and the late Mr Knudsen of Kauai, to Mr Henshaw of Hawaii, and Bro. Matthias Newell, so long resident on Maui, and to some observant sportsmen. For the visiting naturalist the sea and coast birds possess little attraction, and while Drepanididae and Meliphagidae remain in the mountain forests, the former will naturally receive scant attention from such an one.

MAMMALIA.

At the time of the discovery of the islands by Capt. Cook a few species of mammals were found established in them. A rat (*iole*) and perhaps a mouse, a peculiar breed of dog (*ilio*), one (or perhaps two) species of bats (*opeapea*) and a hog (*puaa*) made up the list. Since that time other rats and mice, domestic mammals of various kinds, other species of bats, and the mongoose have been imported, either accidentally or for special reasons. An Asiatic deer, unwisely imported into Molokai, has played havoc with the forest on that island, and it became necessary to employ skilled hunters to check its excessive increase. The mongoose was (as in other countries) imported for the extermination of the foreign rats, which ravaged the fields of sugar cane. By some it is said to have been of considerable benefit, but it is noteworthy that while the plantations of Kauai formerly suffered extremely from the plague of rats the mongoose was not taken to that island. Yet at the present time I am unable to learn that rats are a greater pest on Kauai than on islands where the mongoose has been established; and hence it is probable that the decrease in numbers of the rats was by no means due to the mongoose, but to some cause which affected all the islands alike, whether the mongoose was or was not present. The bats, imported for special purposes, appear to have all died out. The small species (*Lasiurus semotus* Harrison Allen), frequenting the mountains, is common locally in the uplands of Hawaii, and I have seen it, though very rarely, on Kauai and Oahu. It very seldom visits the lowlands and probably only when driven down by stress of weather.

The rat is supposed to have been a peculiar species, but no evidence exists on this point. It was quite small and is now probably entirely driven out by the common grey and black rats, introduced by ships. Shooting these native rats and the flightless rail (*Pennula*) with bow and arrows appears to have been a favourite sport of the chiefs. The imported rats now abound in many parts of the forest and lead largely an arboreal life, feeding on such fruits as are to be had, especially that of the Ieie (*Freycinetia*) and the mountain apple (*Eugenia*) and on the brightly coloured arboreal molluscs of the genus *Achatinella* and the duller ground-frequenting *Amastra*. Mice abound throughout the grass-lands and form a large part of the food of the short-eared owl. They appear[1] to have been present before the arrival of Cook, but it is by no means certain that the species, now so numerous, is the same as the former inhabitant, and it may be that the latter like the native rat has been supplanted by the common foreign mouse.

The dog, as stated above, was of a peculiar breed and was used for food. It was fed largely on 'poi,' the paste, prepared from the taro, which formed the chief food of the natives. The poi-dog is now a thing of the past.

On the whole it is probable that excepting the bat (*Lasiurus semotus* Harrison Allen), which was a natural immigrant, all the mammalia existing at the time of the discovery were brought by the natives themselves, or in the case of the mouse and rat, these may have been escapes from ships wrecked on the coasts.

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[1] There is some doubt on this point. Certainly they were abundant in 1825.

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